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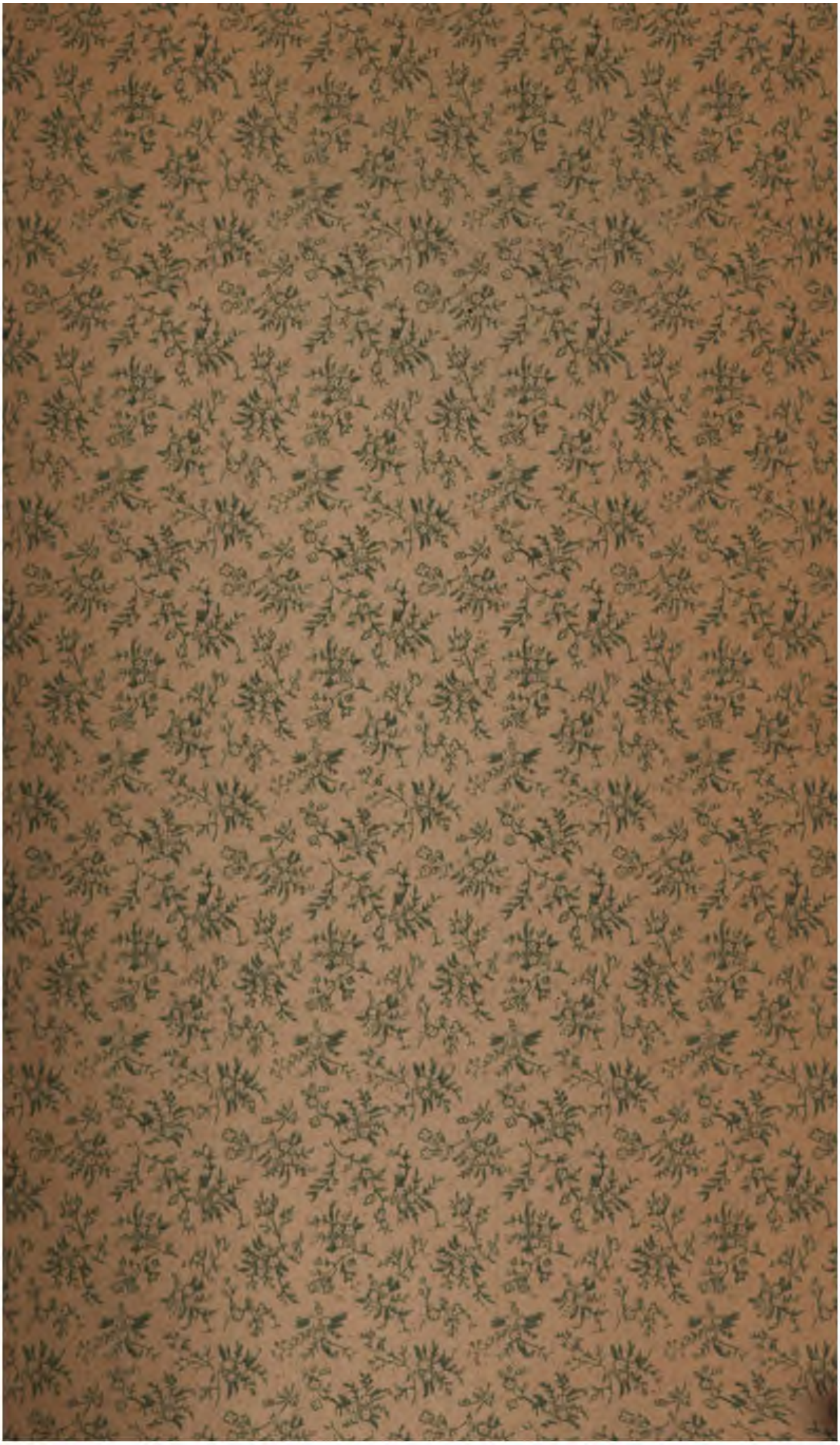

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ACROSS SOUTHERN BASHAN.

By G. ROBINSON LEES.

Being a resident in Jerusalem, and knowing something of the language, I had opportunities seldom afforded to Europeans of seeing the country and forming an acquaintance with its people. And as I travelled at a time of the year when no visitors are expected—the summer—and in a very humble way without tents and their accompanying camp-followers, I was able to get through many places without being particularly noticed. As I had already made several excursions on the east of the Jordan, my plans for crossing Southern Bashan, from Amman to Salkad in the Jebel Druze, were easily prepared. Only two difficulties presented themselves—how to escape the notice of the soldiers attached to the Kaimakamalik of Es Salt; and how to avoid the Bedawin, who were then in a state of great excitement on account of the fighting that was going on between the Beni Sakr and Rawallah. To this latter circumstance I now attribute the success of my undertaking, as the different tribes were apparently too busy with their own affairs to notice mine. But another obstacle quickly appeared; no natives of Jerusalem, who have a wholesome fear of the Bedawin, would accompany me unless I promised to procure an escort. I had a pleasant recollection of kindly treatment by the Circassians on a former journey, in spite of the evil reputation they bear in the country, and therefore determined if possible to make use of them.

Armed with a letter of recommendation to the Reis el Bellady of Amman, Mohammed Effendi, I left Jerusalem with a party of seven, on August 22 last year (1893), which included another Englishman besides myself, also a resident in the Holy City, Mr. E. G. Hensman. I had never before travelled with so large a number, and if it had not been for the sake of carrying provisions and water from the Zerka, I would have dispensed with at least three of them. One advantage of travelling in summer is the absence of rain, and beds and tents may be left behind, though on this occasion we took with us a small square luncheon tent, which, for the amount of usage it received, might have spared us the trouble of carrying. We spent the first night on the banks of the Jordan, near the wooden bridge, which had only recently been prepared. It was a particularly disagreeable one, as neither the time of the year nor place is calculated to encourage sleep, and it was not improved when our thirst had to be quenched by the tepid water of the historic river. We were ready to start long before sunrise, but the bridge was full of animals, and we could not pass. They had collected during the night, and would have continued to increase in number, if we had not roused the soldiers who were in charge of the quarantine station there to open the gate, as the latter are disinclined to examine passengers at intervals, preferring to wait until morning, when most of the day's work can be done at once.

The scene that delayed us was very lively, as some of the men in charge of the animals either had no money or pretended to have none to pay the toll, and eventually left part of their clothing in pledge until their return. The fees are, half-piastre for a man, donkey, or load, one piastre for a horse, and two piastres for a camel. When we had passed over the wooden structure, we espied several men in the bushes on the side of the road, busily engaged in relieving one donkey at the expense of another, in order to save the half-piastre toll.

Before we reached the hills we met a party of the Nimr tribe, who asked for our escort; but one of our men, an old servant of mine, was ready with an answer before I could interpose, and replied, that we had expected to see him at the river, and would likely meet him further on, as he knew the direction we should take. We rested at Arak el Emir, a ruin which has often been described, and found the top stone of the wall very tottering. Some young members of the Beni Abbâd drew our attention to it by showing us how it would rock, and very likely the next travellers will find it lying on the ground in spite of the admonitions we left behind us. From Kasr el Abd, the Arabic name of these Jewish remains, we rode up Wadi Seir. Very few valleys in Palestine equal this in natural woodland beauty. From the oleanders that fringe the little stream that runs along the bottom, a succession of trees clothe its sides in plentiful profusion. Here and there the evergreen oaks form a thicket, and then spread out into an open glade, that gives the gentle slope a park-like appearance. Green grass that had not been changed by the summer sun bordered the rushes that grew near the water's edge, and pleasantly reminded us of an English meadow. As the wadi narrows, its sides assume a lofty and precipitous aspect, whose beauty is enhanced by a thick growth that more closely resembles a forest. Several old mills lie unused and desolate along the stream, while others have been repaired since the advent of the Circassians, and are now worked by industrious tenants. On our way to the spring below the village at the head of this valley, we passed a group of Circassian boys shooting at a mark, a very suggestive scene for the future occupation of the Belka. We camped in a brick-field, on the other side of which were the pilgrims from Mecca bound for Hebron. They had left the quarantine station at Kelat ez Zerka that morning, and, according to the information they had brought with them, so had the Kaimakam of Es Salt and some soldiers; but, happily for us, they were spending the night at Amman, and, what was still more fortunate, their destination on the morrow was Madeba, yet further away. Although we were invited by the Circassians to take up our quarters in the "guest house," we declined with many thanks, even when we heard there was a wedding in the village, but at the same time made ourselves agreeable to the succession of visitors that called upon us, some of whom were interested in the items of news we had brought from Jerusalem.

The village, lying on the hillside surrounded by the oaks of Wadi Seir, is very picturesque, and one of the prettiest spots in the country. There is an air of prosperity about the settlement, and the stranger-people seem happy and contented. Every year their numbers increase, and they gain a firmer footing in the land of their adoption. The woods ring with the sound of their axes; and a saw-mill, worked by hand as yet, prepares boards for the Jerusalem market. The bricks, which I examined close to our resting-place, were made of mud and bits of straw (tibin), and then dried in the sun. Perhaps the term "bricks" is incorrect, as they are not composed of any very plastic material, and cannot be burnt, but seem rather like slabs of dried earth, about three inches thick, six wide, and a foot long. They are used for building purposes, and the tiny square houses formed by them, when yellow-washed, are substantial and comfortable-looking.

We left next morning late enough to give the local governor ample time to be well on his way to Madeba, which is now a permanent military post, and, after two hours' riding along a road marked by cart-wheels, we arrived at Amman. If the writers who have described these remarkable ruins were to visit the site of Rabbath Ammon and Philadelphia now, they would be very much astonished. The change that had taken place since my first visit three years before was most marked. The population had increased to the number of one thousand Circassians, besides Arab shopkeepers from Es Salt. Two streets had been formed, one for shops alone, and nearly all the houses were surrounded by a yard enclosed by a wall of stone. A market of considerable importance, where grain may be sold and various articles purchased, enables the Bedawin of the Belka to remain in their own country.

Fresh meat can be bought almost every day in the week, and there is actually a baker's shop. Most of the corn of the Belka is brought here, and afterwards sent in charge of Circassians to Jerusalem, who are well able to take care of it, and themselves as well. They have built houses, not of mud slabs like their brethren of Wadi Seir, but of stones, the remains of former buildings. They have had no thought of preserving the relics of by-gone glories, but, with the ruthless hands of homeless people, have adapted the massive masonry to the practical uses of every-day life. Nearly all the inscriptions have disappeared, even the huge granite pillars have been cut to pieces, and instead of heaps of stones there is now an active and prosperous colony. The ground in the neighbourhood is well cultivated, and the roads are no longer bridle-paths, but wide enough for the wooden and wicker carts of the people. Jerash, unlike Amman, is still left untouched. The Circassian settlement, though larger there, flourishes on the opposite side of the stream to the old city, and the relics of the Romans repose in their solitary grandeur. The Mudir, Abdul Hamid, is a man of some learning, and finds pleasure in preserving the beautiful remains that lie within sight of the modern town. It would not have been possible for the residents in Amman to have exhibited the same care, on account of the formation of the valley into which they were placed. There was no other available piece of land on which they could settle. They were therefore compelled to make the best of the situation as they found it, and the stones that lay ready to hand. Chased from their homes by the Russians, and again compelled to abandon their new settlements on the western shores of the Black Sea by the Russo-Turkish war, they were offered by the Sultan an asylum in this strange land. That they have now attained a position of strength and importance in the district, speaks well for their courage, fortitude, and industry. When first they arrived they had many troubles, all of which were not entirely due to their neighbours. They are now a power to be reckoned with, though as yet they have maintained peaceful relations with the various Bedawin tribes by which they are surrounded. At first they were looked upon with indifference, but when their numbers grew it changed to hatred mingled with fear; but they were even then a match for the Bedawin, as the following story will show. When they were poor and could ill afford to entertain strangers in the hospitable manner expected across the Jordan, their resources were sorely tested by the repeated visits of the neighbouring tribesmen, all of whom were anxious to see the new-comers. This intercourse received its first impetus by the lavish way in which the guests were treated. And as no one likes a good dinner better and cheaper than a Bedawi, there was a succession of calls on the flocks and herds that made it necessary for the Circassians to devise some means in order that they might find a way in which they could retain the pleasant relations that existed with their neighbours, and at the same time preserve their sheep. At last they hit upon a plan that succeeded beyond all expectation. They killed a donkey for the next arrivals, and took care to place prominently on the trencher its hoofs amongst the rice. No sooner were the guests squat round the dinner, than one and all arose in great confusion. "What is this?" said one, as he held in his hand a donkey's hoof. "What have we to eat?" asked another. "Donkey?" "Yes, donkey," was the reply. "The flesh of that animal is our choicest morsel, and we therefore offer it to you." It was enough. The sheep in future were spared, as no Bedawi wished to eat the homely beast that might again be set before them.

In placing the Circassians in the Jaulan (where there is a still larger colony at Canatra), Ajlun, and the Belka, the Sultan has opened out a scheme for the occupation of the country that will materially change its present aspect. They are not only amenable to the laws of the Turks, and strict Mohammedans, but industrious and thrifty. Many are skilled artisans, and others farmers with some European experience. Besides, they are brave, and in many cases trained to war. The most lucrative posts in Damascus are held by this nation, and a large percentage of the military officers in Syria belong to the same race. Nature has also endowed them with other qualities less deserving of praise than those above mentioned, but these belong also to the Bedawin, who lack many of the better ones possessed by them. A Bedawi will not work, and does not care for fighting unless his side outnumbers that of his antagonist. The only worthy trait of character owned by these sons of Ishmael is hospitality, and it is justly esteemed, but if practised without a requisite supply of the necessary elements it reduces the extravagant to penury, or compels him to resort to an illegitimate method of obtaining the wherewithal to keep up his reputation. That many of the sheikhs are in the pay of the Government is a sign of their waning power, both as regards wealth and prestige. Even the great sheikh of the Rawallah, who has recently been created a pasha, no longer occupies the position he once held in the estimation of his brethren in the desert. His connection with the Government and the assistance it rendered has enabled him to avenge defeat of his tribe in 1885 by the Beni Sakr, but the latter are still looked upon as the champions of the anti-Turkish party, and respected accordingly; while the Adwan chief, Ali Diab, is little better than a police inspector. The Sultan, then, in degrading the Bedawin and lessening their numbers on the one hand, is creating in their stead settlers that will sooner or later push them further into the desert, or compel them to adopt the same means of earning their living that they themselves possess. This retrograde movement of the Bedawin, if it can be so termed, is very apparent to any one who is acquainted with the tactics pursued by the officials of the Sultan towards his nominal subjects, but it is the course usually taken by all Governments when developing the resources of a country. It has one ill effect—it turns many into thieves and robbers that were otherwise less disposed to that form of annoyance; but it also furnishes the Government with a further excuse for weakening their power, in its efforts to capture and punish offenders. Where a few years ago these people lived in contentment, that is as far as their avaricious nature would permit them, we find them full of complaint—of the soldiers, Circassians, and Government. They cling more tenaciously to their land, and resist by force any encroachment; but they are on the losing side, and before long the progress of events across the Jordan will have developed so far as to dispossess the present lords of the soil, and place in their stead a people not only more industrious, but more religious, and more inclined to pay the taxes. The change that is now going on over the Jordan will develop the natural resources of the provinces occupied by the new settlers, but whether it will yield a corresponding degree of peace and happiness remains to be seen.

BOSRA AND THE ROMAN ROAD.

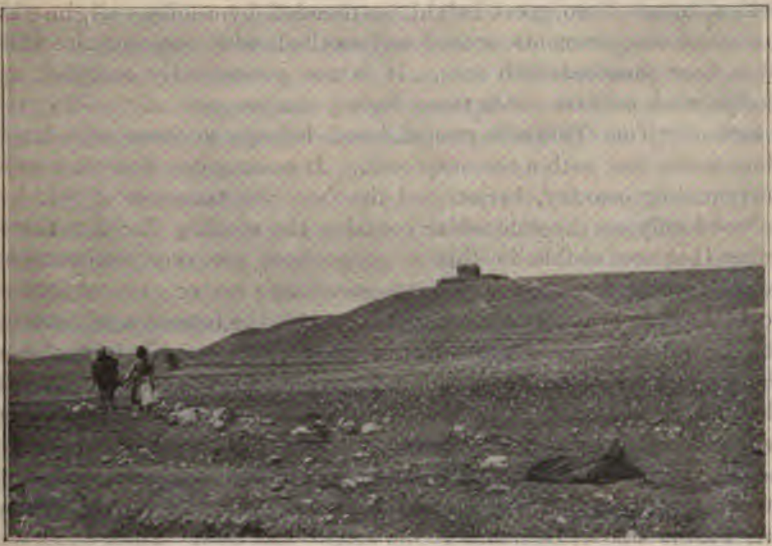
The country south of the Hauran, Southern Bashan, is yet untrodden by the Turk, except on the line of march to Mecca. It belongs absolutely to the Bedawin and Druzes, and is at times frequented by those who perhaps never saw an official, or at any rate would not acknowledge either his authority or that of his imperial master. It is usually represented on maps by a blank space, or a band of colour that marks this region as the most eastern boundary of Palestine, south and west of Salkad; while other maps in addition contain from one to four lines hesitatingly drawn across the country. These lines show all that is apparently known of that region. On no two maps are they the same, but the two that commence at Kelat ez Zerka and run north-east and north-west respectively have the most common likeness. They are supposed to show the old Roman road, and the modern pilgrim way to Mecca. Their appearance on any map is due, the first to the existence of the "Tabulæ Peutingerianæ," that show a road in use during the Roman occupation some fifteen hundred years ago, from and to certain known points, Bosra and Philadelphia (Amman); the second, to the knowledge that the Haj road, the route of the Mohammedan pilgrims, runs between two other known points. The other lines sometimes found on maps running from west to east indicate valleys which do not exist as marked. That this part of the country was important in past ages is well known. It was the first land possessed by the Israelites, who overran its fields and captured "the fenced cities" of Og, its king. As Salkad was the most eastern city of Bashan, we may naturally suppose that some of the people of that country lived on the west of it, and possibly also to the south. When the Romans were all-powerful east of the Jordan, there were many cities in this district, remains of which still exist, for the land is fertile, and parts of it even now under cultivation. I was, therefore, not at all surprised to find ruins that establish a closer connection still, seeing that a public highway ran through the land. I believe there was a time, now long passed away, when this part of the country was full of life; when Moab and Bashan were joined by cultivated fields; when Roman Bosra and Philadelphia were connected by a continuous stream of trade and pleasure; when this tract of land, now only traversed by the pilgrim caravan, was a highway not less in use and importance than any other in Palestine. The line of march annually taken by the Haj is usually supposed to form the border of a desert plain. The expression "across the Haj road" is frequently used to mean a region parched and dry, as flat as a board, and inhabited by Bedawin nomads. This is not altogether true. Beyond this road are hills and dales, and trees and flowers.

Burckhardt collected some very valuable information, but failed to reach Umm el Jemal, and, after many attempts to proceed south of Bosra, retired to the north. Dr. Eli Smith, and before him Buckingham, on the way from Bosra to Salkad along the beaten track of the old Roman road, obtained from the natives lists of names of ruins. Mr. Douglas Freshfield journeyed from Jerash to Bosra and Salkad across the country from Gilead into Bashan. But, as far as I can learn, no Englishman ever made any excursion to the south of Bosrah direct, or from Salkad to the west, except Sir Cyril Graham, Bart., and he was the first to see Umm el Jemal and the ruins round Salkad. Two eminent Frenchmen, Count de Vogüé and M. Waddington, followed in his footsteps as far west as Umm el Jemal; and Dr. Selah

Merrill, an American, on one occasion visited these interesting ruins from Bosra, returning again to the same starting-point. Between the Zerka and Umm el Jemal, or east of the above-mentioned stream, no one had ever been, and even the Bedawin round Amman knew nothing whatever about it. When I took my letter to the chief of the Circassian community, he collected his friends and made inquiries, yet no reliable information was obtainable, except that one day's journey from Kelat ez Zerka there is another pilgrim station, Khan el Fedheen. No Arab would venture with us, and for a long time the Circassians refused to be persuaded. All agreed that it was full of danger and a favourite battle-ground of the Rawallah and Beni Sakr. After a while, when I had said that I would go without an escort, and bid them good-bye, the thought of the sum I had offered caused them to more favourably consider the matter, and it was at length decided that two should accompany us, on condition that I provided food and water for the journey.

We started the following morning with Mahmood Aga and Mustapha Effendi, the latter the brother of the Reis, and rode down the side of the Zerka. I now began to realize the one drawback to summer travelling—the country is dressed in its worst coat; yet even for this there is some compensation. A description of its appearance in the hot season is a change of subject, as all travelling in Palestine is done when the effect of the rain has not altogether disappeared. It is much more pleasant at that time, and certainly cooler; but a complete account of its appearance cannot be given, nor can any estimate be formed of the radical change that takes place after the sun has expended its power on the face of the land for two or three months. And if at this season grass and flowers are found, and ground under cultivation, the conclusion may very naturally be drawn that the soil is fertile and there is no desert.

Though the Zerka, whose source is close to Amman, seemed shallow, it was from 5 to 7 yards wide, and full of fish. In half an hour it gradually oozed through the sand and pebbles of its bed and was lost, but in twenty minutes more (about a mile) it appeared again, stronger than ever. In three other places it disappeared, but not for so long a distance, how far I cannot exactly say, as the border of oleanders hid the exact spot from view. About halfway down from Amman to Kelat ez Zerka, or, more correctly speaking, one hour and thirty-five minutes from our starting-point, a small stream from the north joined the Zerka. On the way down we saw many kingfishers darting hither and thither over the bright waters, and partridges along the hillsides; here and there a solitary butm tree, and always oleanders, though the latter were stunted and sparse where there was no water. No doubt in winter there is a much larger stream that fills the entire length of the river-bed, and then they look more fresh and strong. Traces of Bedawin encampments appeared in the wider parts of the valley, and scattered ruins told of a time when it was occupied by a busy people. But the most unusual sight was a flock of griffon vultures intent on objects that engaged their attention until we were close upon them. The stench that rose in front of us as we approached quickly brought to our notice the carcases on which they were feeding. We had now reached the place where the Haj road from the south first crosses the Zerka, and enters the plain in the valley that is annually used as the camping-place of the pilgrims. Remembering the many cholera stories we had heard, and knowing that this was a quarantine station vacated but two days before, we lost no time in crossing it. The scene was desolation itself, and as it extended for more than a mile, it enabled us to form some idea of the size of the camp. We counted forty-six dead camels in various stages of decomposition, some apparently having only just expired, while the bones of others were picked quite clean. But a more saddening sight was yet before us—seven graves fresh and newly made, each a little mound of earth surrounded by loose stones. Old rags, tins, and tattered slippers told the story of the weary way from Mecca; but the little heaps of sandy earth appealed more strongly to the feelings, as the marks of the last stage of life's journey.



KELAT EZ ZERKA.

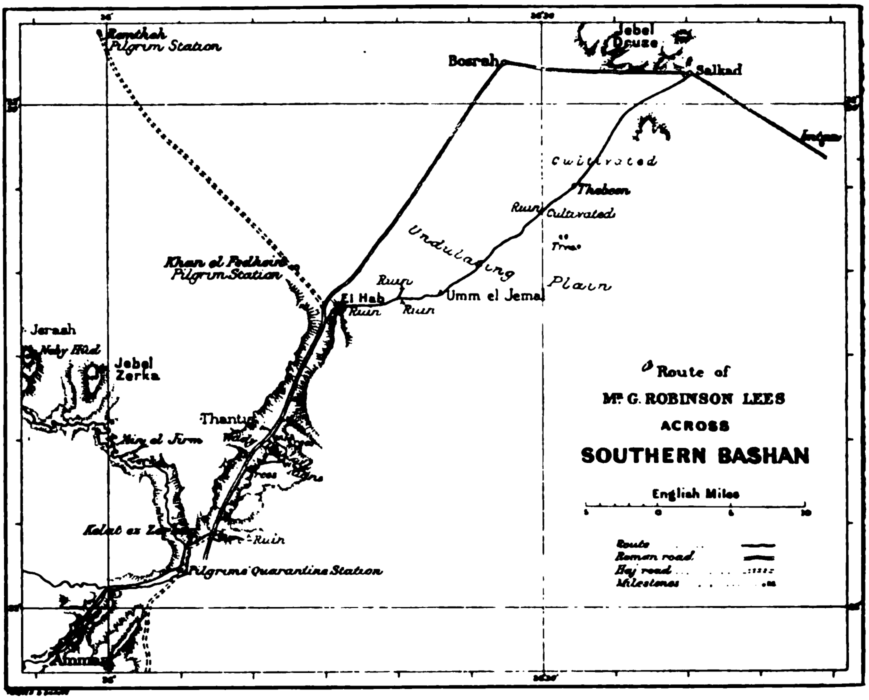
We arrived at the ford below the hill on which the castle stands after riding three hours and a quarter, and there unpacked our things in order to rearrange and more equally distribute the baggage when our future water-supply was prepared. While the men filled the water-skins (six large kerbys) and made ready for the unknown region beyond the hill, H——, the two Circassians, Achmed, one of our men, and I rode up to the castle to take photographs and bearings. On reaching the building, which is very modest in its dimensions, we looked anxiously and carefully in the direction of our proposed route, but nothing but a succession of bare and conical hills, with intervening valleys, could be seen for miles. These seemed to fade in the distance into one long blue line, from which there rose a mountain chain, faintly visible. In order to get a better view and take bearings, we turned our attention to the castle. The stones of which it is composed are larger than those usually employed for building purposes now, but they lack that massive appearance that suggests defensive strength. It is square, and consists of a central tower of no great height, surrounded by a lofty wall, in which are many compartments, arched and vaulted, with one entrance closed by a door sheathed with iron. It is not permanently occupied, and, except when soldiers reside there during the progress of the Haj, it is a sort of "Tom Tiddler's ground," and belongs to those who for the time being live within the outer wall. It commands a fine view of the surrounding country, barren and desolate, the tameness of which is relieved only on the side which contains the winding Zerka. Yet the ruins that are visible in this neighbourhood are very numerous, and suggest a different scene, which it is possible to revive. I gave my horse to Achmed, and turned to the closed door with the intention of mounting the central tower, or outer wall, to take bearings and photographs, but found it fastened on the inside with a long piece of wood. A little shaking moved this bolt, and the door opened. Mustapha Effendi followed me in, and while he turned to tether his horse I glanced hastily round the open space between the central tower and outer structure. Lying on the ground were three men apparently asleep, and by the side of each lay a rifle bright and new. Their faces were covered by their kuffyiehs, their feet were bare, and their legs only partially hidden under the folds of very ragged abyahs. I called the Circassian's attention to the sleeping men, and he at once turned to leave the place, waving his hand for me to go in front. We pulled the door after us, and quickly mounted our horses. Arms were at once seized, and we moved slowly from the shadow of the castle wall, then waited some minutes in silence. Not one made his appearance, so we left the hill and rode down to the stream below, from whence we saw two of the men standing on the castle wall looking towards us. Who and what they were we could not easily define; nor could we say if they were more in number than we had seen. They had no horses, were badly dressed, yet well armed, and must have heard us open the door and enter the building, but they never spoke. They might have even been aware of our approach from the distance, yet they hid their faces from us and feigned sleep. Their appearance was suspicious, and the Circassians at once pronounced them Jaish, robbers. They must have found us too strong to attack, and in order to avert suspicion pretended to be asleep. When we reached the water there was some talk of a return to Amman, but I was determined to push on at all hazard, as I was sure we had the stronger party, or the attack would not have been so long delayed, unless they thought we were afraid and would return, though that would not have suited their purpose. The Circassians then said they would go up again and speak to the men; if they were attacked, and we heard firing, we were to follow and help them. My chances of photographing the country from the castle being spoilt, I set to work at the ford, taking one on each side. The Haj road is at least a mile from the castle, and could not therefore be brought in the picture. I took special notice of this, as I had hitherto supposed that the castle stood on the side of the pilgrim road, as it is usually marked so on maps, whereas it is about as far from the Haj road as it is from the ford, the place from which the photograph is taken. I missed one picture that would not only have been interesting, but unique: a hyena, after gorging himself at the feast of camels behind us, leisurely mounted the hill in front. Still more unfortunate, we had no rifles, and the Circassians had naturally carried theirs with them, and the beast was soon out of the range of our guns. When the men returned in peace with their rifles, he had disappeared. They said there were seven men in the castle; they had spoken to them from a distance, but could make nothing of them whatever, but they were quite sure they were robbers and belonged to no respectable tribe. One of our men, on hearing this, tried to sneak away with a horse and return to Amman; but I quickly gave them all to understand that, as soon as the baggage was on the animals, we should march along the road over the hill. Our escort made no further demur, and we were soon on our way. Starting at two o'clock in the afternoon, we rode on until half-past seven in the evening, spending a little more than half an hour on the way at a ruined town we discovered. From the hill that we ascended, on a spur of which the castle stands, we were traversing entirely new ground, unknown and unexplored. For nearly five hours we followed the direction of the Haj road, taking bearings all the way. It differs in no way from what I have seen of it before near M'Shetta, and in the more northern part of the Hauran, but is well defined, consisting of numbers—in some cases I counted fifty—of footpaths, running more or less parallel with each other.

On reaching the top of the hill we entered a small plateau, the only level piece of land that could be seen, bounded on all sides by hills except in the direction of the road. To the right of us, some seven minutes from our path, were columns, exactly like the Roman milestone on the Damascus road near Shafat, about two miles from Jerusalem. Fifteen minutes further on the road we found three more, one *in situ*;

and for nearly five hours along this route we met with these columns, all exactly alike, and separated from each other by intervals that averaged fifteen minutes, or a multiple of this number. On one of them were letters barely legible. Most of them were badly chipped, as if the pilgrims had battered them. In no case were they smooth; while in others Arabic letters were traced on them with a blunt instrument and by unskilled hands; on more than one there were faint tracings of Roman letters, but unintelligible. I know of no map that does not make the Haj road and the old Roman road diverge at Kelat ez Zerka—that is, if they are marked at all—according to the two lines I have before mentioned as representing them. This, then, is a most important discovery—that for four hours and a half, at least, from the hill south of Kelat ez Zerka, these two roads *follow practically the same route*, which is marked by Roman milestones, and in one place the set stones of the road, and, as we saw it, the remains of the caravan that passed two days before us.

After being on the march one hour, we saw a ruin to the south-east perched on one of the hills about an hour away, possibly the remains of some fortress—an outpost probably, the bottom part of which seemed vaulted, as half of it looked towards us dark and hollow. The hills to the east are in many places huddled close together, with very little space between them—so much so, that as soon as one is descended the ascent of the other begins. This outlook of rounded hilltops is varied occasionally by a small plateau, but the tameness is still the same. Before we lost sight of the ruin on the south-east we struck a dry torrent bed that came from the hills. Along its winding course were many evergreen oaks, and on one side a jagged seam of chert peeped from the eastern limestone hill. From a distance it looked like a ruined wall. So far we had seen no wady, but the road we were following was a well-defined and undulating plain between two ranges of hills, that were higher on the western than the eastern side. We passed a new grave on the roadside, and an older one with a headstone; and where the plain was widest we saw some scattered stones on the side of a hill, some of which were heaped together; but not the slightest semblance of a road or path had we seen on either side until we had been riding one hour and forty minutes. Before we turned due east along this, the first path we had discovered, we had noticed that the plain, down which ran the watercourse, was sloping towards the foot of some higher hills than we had yet seen. A rift between them pointed to a wadi as the destination of the dry torrent bed. We crossed the watercourse some distance before it reached the wadi in front, where there were signs of a bridge that had been removed and lost in the boulders of the winter stream, and followed the path above mentioned, as it led upon the hillside to a plateau covered with withered grass and alkali bushes. As we rode along we saw traces of an encampment and the recent track of a horseman. This plain shelved down to the wadi that ran through the cleft that we had seen in the hills of the west, but on its south-eastern side the hills rose peak after peak far out to the horizon. It was several miles in length, and from one to three across. In the distance we descried some smoke, and then saw two men burning the alkali shrub that grows so plentifully here, but they disappeared at our approach, and nothing could unearth them. The path we had followed now led into the wadi, and by its side were the remains of several vaulted apartments, which at first looked like tombs, but afterwards appeared to be the lower rooms of some building let into the ground like cellars. Possibly into such a hiding-place the alkali-burners took refuge at the sight of strangers. Beyond these vaults and the heaps of basaltic stones around them were the set stones of the Roman road and fallen columns. We went along the route indicated by these stones, and there joined the Haj road as it crossed the wadi. But as we turned down the path into the wadi to do this, we met two men and a woman with a donkey, on which were well-filled water-skins. We stopped them and asked some questions. They said the name of the valley was Wadi Dhulail, and that it came from the east, from the plain before Salkad. (Its course as we saw it was from south-east to north-west.) They further informed us that they belonged to the Beni Hassan, and had brought the water from their camp in the west for the alkali-burners. This was an obvious falsehood, but we allowed them to proceed. However, the next statement was worse—that there was no road of any kind to the east, and no water, and that the only road to Salkad was along the Haj road to Khan el Fedheen and then eastward, though they had never been themselves. I pointed out the path by which they had come—it was a well-defined and beaten track; but they readily answered that it went but a short distance along the side of the wadi, although it could be seen for more than a mile, and looked so well worn that it suggested the inference that it was a highway in constant use. It was four o'clock in the afternoon, and these people had with them two full kerbys of water. They had come from the east and were journeying westward. We did not think it wise to dispute with them, or even to show any desire to test the accuracy of their information by riding along the wadi, but turned aside. But at such an hour of the day and in such a place it was hardly possible to believe that water did not exist in some old well or cistern, or even a spring somewhere along the wadi from whence they came. Dr. Selah Merrill and his party rode along the course of the Zerka some distance to the west of this road, and the following extract from 'East of the Jordan,' p. 396, has some important evidence on the direction of this wadi and its water-supply: " Ain el Jirm is two hours forty-five minutes north of Kelat Zerka. Twenty minutes south of this point, a large wadi enters the Zerka valley from the east. It is called Wadi Dhulail, and I refer to it because it illustrates what a vast volume of water may sometimes flow in a wadi which is dry most part of the year. In this case, judging from the marks of the *débris* on the bushes and banks, this stream must have been from 50 to 70 yards wide, and from 3 to 6 feet deep—so deep that it would be impossible for animals to cross."

The distance between the point where we struck Wadi Dhulail and its mouth in the Zerka valley must be about 8 miles. We had been riding two hours to the north-east, and its entrance into the Zerka is two hours and twenty-five minutes north-west of the castle.



Two points relating to Wadi Dhulail are thus proved: first, that its course is from south-east to north-west, where it is crossed by the Roman road and the Haj road, and from thence to its junction with the Zerka; and, secondly, that at one time of the year it contains "a vast volume of water." We crossed it in twenty minutes, and passed on our way evergreen oaks and flowers, besides wild thyme and other bushes. A plain emerges from its northern side, which is marked by a Roman milestone. From this point, the commencement of the plain along the Haj road, to where it turns westward at the foot of the highest hill of its eastern border, it took us two hours, good hard riding—that is, of course, with luggage animals. But as soon as we entered it, we noticed, on the rising ground of the west, a ruined town, to which we turned our horses' heads and reached at a quarter to five—two hours and forty-five minutes from Kelat ez Zerka, and six hours' actual riding from Amman.* It has a fine commanding position, overlooking a plain for some considerable distance both on its eastern and western sides. Few towns in Palestine occupy a position of greater excellence, on land more eminently fertile. As we approached the ruins we were struck by what appeared to be ground under cultivation and traces of gardens. On the south is a large cistern about 40 feet long, 20 feet wide, 20 feet deep, cut out of solid rock, and its sides covered with cement. The remains are scattered, though in places stones are heaped together and we could not pass, and cover an extent of ground that would take an hour to encircle. The deserted houses still stand with the lintel stones over the door-posts, all built of the same stone, basalt, and exactly in the same style as all the ruined towns of the Hauran. We recognized the remains of a church, and other buildings of like dimensions, but found no inscriptions, no doubt as we could only spare time, much to my regret, for a very cursory examination. We were all strangers in a hostile country, seen by people who always suspect that the presence of unknown horsemen means prospecting for a new camping-place, and we were much more open to suspicion on account of our companions, the Circassians, who are annually increasing in numbers, and taking up lands hitherto but lightly held. Besides, the only resting-place for the night that promised reasonable safety was, as we then thought, Khan el Fedheen, a pilgrim station far along the Haj road; so we had to push on, and the impatient escort beat the animals with their whips to increase the pace.

Unfortunately, we had no means of ascertaining the name of this ruin; but from its position, the importance of its remains, and the site on which they stand, I have no hesitation in saying that when the "Peutingerianæ Tabulæ" were drawn up and issued in 393 A.D., it was known as THANTIA. This city, according to the Roman map, was on the road from Bosrah to Philadelphia, 24 miles from the former and 20 miles from the latter place. We had ridden from Amman (Philadelphia) to this place in six hours; reckoning the little delays on the way in taking bearings and our chat with the Beni Hassan, that is equal to 20 miles. It is on the road now traversed by so many weary feet, where we found milestones and in one place set stones. And further, our camping-place that night, two more hours on the road towards Bosra, was almost due west of Umm el Jamal, which is five hours from that ancient city. That means that THANTIA is seven hours from Bosra, or twenty-four miles.

We joined the road again from this place, which was as well marked as ever by the remains of the caravan that had passed but two days before, including two more dead camels and another grave. There were also more milestones and a wider plain. Far away in the distance on the west we saw Neby Hûd, which plainly showed that between the hills immediately to the west of us and the range on which it stands there are other hills and at least one wide valley or plain, and likely many more. Another interesting feature I noticed was that all the hills east of the Neby were of lower elevation. Many alkali-burners were scattered over the plain along which we were riding, who were busily preparing the ashes for transport to Nablus for the manufacture of soap. They seemed ill-disposed to answer questions, so we passed on with little gain beyond the information that there was a ruin on the summit of the highest hill ahead of us. When we reached the foot of it we left the Haj road, turning round its western side, and climbed up to the top in the dusk.

This peak is not only the highest point of the range that borders the plain of Southern Bashan, but also the apex of that chain, and forms the northern limit of the hill district that runs up to a line with Umm el Jemal, two hours further east. On both its northern and eastern sides it slopes very gradually down to the great plain that stretches along the Hauran past Bosra on the north and as far as Salkad on the east. But on the south it abruptly stands as the northern boundary of the plain we had just traversed. The road winds round its western side and is lost to view, but the parallel range of hills continues its course to the north-west.

We were too anxious about our preparations for the night to notice more than this general outline. But our attention was speedily drawn to the number of scattered stones, and walls enclosing folds for cattle, that extended a considerable distance down the gentle slope. These all seemed to increase in number as they diverged from one central rectangular wall. The stones at this middle point were very large with a rough face, but the other stones decreased in size in a similar ratio to their distance from the centre. Into this, the most important enclosure, we entered, unpacked our animals, and prepared for the night. In the very middle there was a large hole or cavern cut out of solid limestone rock. Its sides were very uneven, and there was no appearance of any cement on its walls, or we might have thought it was a cistern. A wild figtree occupied one corner, and a pile of stones filled up the centre. This irregular heap prevented a more detailed examination of the interior. Several columns lay partially embedded in the surrounding earth, and other massive stones were heaped together in wild confusion. The number of open spaces and arrangement of walls showed that it had been often used on account of its being a post of observation, and advantageously situated in a position of comparative security. But at the same time, it was one of those outposts now occupied only by a transitory people, and not as a permanent abode. We were now in possession, and had to take the necessary precautions for our mutual protection, and the preservation of our animals and baggage. We refrained from lighting a fire and thus attracting attention, but were sufficiently hungry to eat heartily of a cold supper. All our things were collected and placed conveniently together; arms were examined, and the night divided into watches between H——, the Circassians, and myself. As I patrolled the ruin in the moonlight with my Circassian companion, I could see distinctly the route by which we had come the day before: the valley plain bounded by two ranges of hills running north and south, a natural highway, and the only one to be seen in the district; a road that still bears the marks of many feet; one that has been used from time immemorial, and without doubt the way by which the Israelites marched to the grand tract of country that I could see on the north and east, stretching through the dim light into the darkness. What their feelings must have been when the wide expanse of country burst on their view as they turned round this hill, and the great plain of Bashan rolled before them, can be imagined by the naturally formed desire of the tribes of Reuben, Gad, and Manasseh to take possession of their inheritance without delay.

I do not think that the country through which we had passed ever belonged to Moab, and therefore the Bozra and Beth Gamul that are often located on the eastern plain must be looked for further south. The Umm el Jemal of Southern Bashan has no connection whatever, beyond the similarity of its name, with the Beth Gamul of the Old Testament. I quite believe the plain was covered with cities as far as the hills that surround Kelat ez Zerka, the boundary of the Ammonites, as no strong and capable ruler would have left such a magnificent territory untilled. And there is ample evidence, in the ruins that dot the plain, to show that during the Roman occupation it was full of people, and well cultivated; and though there are no marks that would identify the remains as belonging to a period before the Israelitish conquest, many of the sites have no doubt existed from before that time.

Dew fell heavily during the night, and I was unable to take any photographs before starting, as the damp had penetrated my camera; but I took bearings, first along our route of the previous day, and then to what seemed in the distance the castle of Salkad. Between our starting-place and the castle on the east was a wide plain, as it appeared to us early in the morning, unbroken by either hills or valleys. To the north we saw a ruin, which we thought was Khan el Fedheen, a pilgrim station, and we afterwards heard it was one hour from this hill, which we were told was named *El Hab.*

We rode down the eastern side of the hill and almost imperceptibly entered the plain, as the slope is so gradual. After riding for some time along the level ground, we found that it was by no means flat, though it usually appeared so in our immediate neighbourhood; yet some distance beyond, it rose and fell in long wave-like swells of sufficient height to hide at times even such an object as the range of Druze mountains on the east. We never saw Umm el Jemal until we were within an hour of its ruins, although it was but two hours from our camping-place. We scanned the plain on all sides for any signs of life. A herd of gazelles scampered along in front, but no other living thing seemed near, not even a partridge or a hare, but we soon met with traces of Bedawin encampments. The only ruin we saw that did not consist of a central heap of stones surrounded by folds for cattle was one that seemed to be all that was left of a group of buildings attached to one central structure. It was never a city, unless a tremendous quantity of stones have been carried away; it might have been a hamlet, as the houses in the Hauran were usually built close together, as if they rested on a central wall with large enclosures playing out in all directions. Yet from the distance it forms a landmark that differs but slightly from the ruins that have been described as "giant cities," and yet could not without exaggeration be called even towns.

But away to the east, rising from the level of this Southern Bashan plain that stretched away to Jebel Druze, there rose a long black line jagged and irregular, which gradually developed, on nearer view, into something like a mass of ruins resembling a deserted town. On the outskirts of this desolate pile, lying far away from all that makes a city full of throbbing life, we saw first an old reservoir edged in by massive stones with a rough face. No wall or gate marked the city boundary, nor were there buildings conspicuous by their architectural beauty; but black basaltic stones, piled on one another without the adhering power of mortar, formed houses that for their size and loftiness have few equals in the whole of the land. The stony desolation into which we entered was not relieved in a single instance by a piece of either wood or metal. Everywhere was stone, except in the deserted squares enclosed by the buildings, and there intermingled with fallen masonry were weeds and withered grass. The houses were all built in the same way as those of the northern Hauran and Lejah; the second story, which is reached by a flight of steps on the outside of the structure, rests on arches made of a pile of stones, and long stones that jut regularly out of the wall afford additional support. Many of them were in an excellent state of preservation, and all seemed as if the inhabitants had left through a pestilence rather than the ravages of war; time alone appeared to have dismantled others, assisted by the wind and tempest. Several small churches were found in the confused mass of ruins on the western side. But on the north-west there was a large structure, the most conspicuous of all, with open spaces on every side, that evidently seemed to have been foremost in the esteem of the inhabitants. This was a large church, the sides of which had disappeared, but the arches forming the nave were beautifully preserved, with a cross on each side. It was built in an east and westerly direction, with an apse at the former end still left entire and covered with cement. Over the entrance on the western side was a stone which seemed to have been intended for an inscription, as it had a carved border, but, if there, it was illegible. On the western side of it, and also to the south, were vaults arched in the same way as the church above, one part of which was enclosed by a cemented wall. This apparently was the baptistry attached to the sacred building, and was approached by a flight of steps on the west near the entrance to the church. Adjoining this was another building, in which were lying large columns and heaps of carved stones, that pointed to the obvious importance of this part of the town. A little further to the north, under an archway, was a stone with a Latin inscription of six lines, the only legible part being—

IMP CAES MAUR ANTONINO
AUG ARNIMPARIMID M M
PASU ROI M S

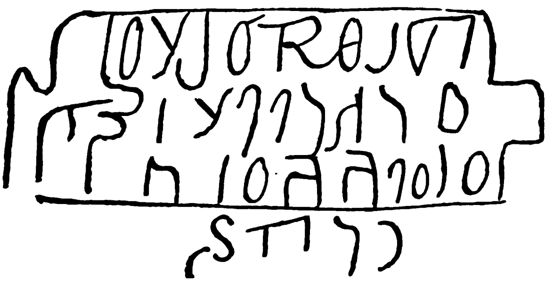
No. 2057 (*a*), published by M. Waddington, is similar to this—

IMPCAES MAUPANTONINO
AUGARIMAPIMEICE B M.

With the exception of the following, I found no inscription that is not in Waddington's book. It was on a stone built in the front of a house.

ΚΑΟ Μ ΑϹ
Ι ΡΧ ЄΤΑΤΟΥΑΝ ʎΤ
Ι Є ϹΘΝ
Χ Α ΑΑΝ

At the bottom of a wall almost covered by weeds was the following in Nabathean:—



Of this I have an imperfect negative.

The town was divided into two parts by a wide and open street very much wider than any I have ever seen either in the Hauran or any other part of Palestine. To the south-east was a large building that no doubt formed the citadel. The only tower in the place has been described by Waddington. On its sides he found the names of the angels Michael, Gabriel, and Uriel, about which he says, "Les archanges Michel et Gabriel sont assez souvent nommés dans les inscriptions chrétiennes; mais c'est la première fois, je crois, qu'on rencontre le nom d'Uriel sur un monument antique" ('Inscriptions Grecques et Latines de la Syrie,' p. 487).

But the most remarkable feature of this city is the number of crosses to be found on the door-posts and lintel-stones of the houses. There is no other town, ruined or otherwise, in any part of the country, that contains such a large number of these sacred emblems. This fact is very significant. Umm el Jemal has no remains that may be assigned to any period prior to the advent of Roman power; neither are there any signs of Moslem occupation. The only epoch of history represented in these ruins is that which flourished under the Roman and Byzantine emperors who posed as Christian rulers. One might, therefore, naturally suppose that it is solely a Christian city. Standing alone in the desert away from any other large city, it looks like a place of refuge. Yet from its position towards the south of the great plain of Bashan, it must have been the site of some older city. A few Nabathean inscriptions have been found there by M. Waddington and his companion Count de Voyüé, and one shows that the worship of Dusares, the Syrian Bacchus, was carried on, very likely before Christianity was openly acknowledged. This must have been earlier than the fourth century, before the cross-carving era commenced. Up to the time of Constantine, the Christians were scarcely tolerated, and more often persecuted, though the Ebionites, and afterwards the Nestorians, resided in large numbers in this part of the country. But for safety's sake they exhibited few of those signs of their religion, such as crosses, that would attract the attention of the Government. The Nabatheans were powerful both before and after Roman ascendency, and their worship of idols agreed with the ideas of the Italian Power. But when the Roman emperor adopted the religion of the Christians, the power of the pagan natives waned, and their worship gradually ceased. The Christians were then able to practise their rites and ceremonies, not only openly, but with the ostentation of a new-born freedom. Consequently crosses and other religious emblems were carved, not merely on the different parts of churches, but even on lintel-stones over the doors of their houses. Inscriptions in very elementary Greek were extensively cut on stones and placed in all new buildings as votive offerings, or memorials of those that were loved and lost. The province of Bozra, which no doubt included Umm el Jemal, though by what name is not known, contained thirty-three bishoprics. This prosperous period of Christianity lasted only about 300 years, in the fourth, fifth, sixth, and seventh centuries. And when this city was deserted by its people at the Moslem conquest, they carried with them into obscurity its name, for the one it bears now is a modern appellation only.

That this interesting city appears to have no connection with a period little more remote than the establishment of Roman influence is easily accounted for when one considers the natural laws and habits of men. This plain was in all probability covered with cities before the Israelites appeared in the country. It has been the scene of the strife of armies from the time of Thothmes III. (about 1600 B.C.) to the present day. And while cities built chiefly of combustible material were burnt to the ground and laid utterly waste, these stone-built towns that contained neither wood nor metal, but trusted in doors and windows of stone, may have been demolished, but the hard black basalt could never be consumed. Sites would be preserved as they are now, while the marks of a period were completely obliterated. I can illustrate this by what I afterwards saw at Suweide. Some years ago, less than thirty, it was a ruined city, noted alike for the beauty of its remains and their desolate appearance. At present there is not a single uninhabited house, and a Kaimakam resides there with a regiment of Turkish soldiers numbering never less than a thousand men. There are streets with shops, and the whole place is pervaded with an air of prosperity; even the ruined temple is turned into a dwelling-house. Masons were at work splitting the large stones into smaller ones. Unwieldy masses were being cut down into sizes more easily adapted for use; and I believe the picture I saw of the workmen utilizing the stones scattered about, irrespective of either shape or weight, for the erection and completion of houses, is one that will account for the absence of those marks of antiquity that one naturally expects to see on a site that justifies the identification attributed to it. I do not mean to infer from this that Umm el Jemal may be the Beth Gamul of the Bible—the former is in Bashan, and the latter was in Moab—but that it is an old site, older than the crosses on its stones, whose name is lost.

Our Circassians for some time had been anxious to return; they had wished to do so in the night, but repented when they saw how readily I offered to release them from their bargain. They were, however, now beginning to show signs of fear both of Bedawin and the Druzes we were about to visit, saying there had been some collision between their people in the Jaulan and the Druzes; but when I again told them they might go if they were afraid, they reluctantly refused. We kept a sharp look-out for Bedawin as we moved eastward, in the direction of Salkad, riding the while close together after their manner in a strange and hostile country. In about an hour we saw signs of cultivation, and crossed ploughed fields, to the south of which were trees. And only a short distance to the north of us (as we afterwards learnt) a different scene was being enacted to our peaceful progress.

Fifteen Rawallah Bedawin, who were prospecting for a camping-place, with a further intention, no doubt, of removing anything to their camp that came in the way, approached too near the Druze town of THEBEEN. They were seen by the sheikh, and as their appearance could not be tolerated by the ostensible owners of the land, he rode out with three men to show that their presence was in no way desirable. In the fight that ensued one Druze was killed, and the horses of the others were captured, and they returned defeated and on foot. We heard both in Bosra and Kunnawat that fifty Druzes had brought back the horses, and that a blood-feud had commenced that would necessitate the loss of more lives.

The first people we met were two riders rather remarkably attired, having only a pocket-handkerchief between them, and that was used by one of them as a covering for his head. It is only fair to add that they were boys, but of more than tender years. They belonged to THEBEEN, the town above mentioned, three hours from Umm-el-Jemal. We found the men assembled in groups, probably discussing their defeat and the loss of one of their men, or wondering when they would return and with what success. Our appearance was in no way opportune, judging by the cold reception accorded to us. As we had to make our peace with the people, who never asked us to alight, we were unable to examine the town. The sheikh was absent, they said, but one of the men offered to accompany us to Salkad. After a while he became talkative, and informed us that the place was inhabited solely by Druzes; that it was two and a half hours from Bosra, and three hours from Salkad. The latter we afterwards proved to be correct. It is not marked on any map whatever, and is some distance away from the road between Bosra and Salkad. It has never been mentioned except by Buckingham and Dr. Eli Smith, and they merely recorded the name as given to them in a list of the ruined cities on the plain. Two very large reservoirs, extensive ruins, and a population of some hundreds show that it is of some importance, and was still more so in olden times. I saw stones built in the sheikh's new house bearing inscriptions, but I could not read them without appearing more inquisitive than I deemed prudent under the circumstances. All the land by which it is surrounded is under cultivation, but covered with an enormous quantity of stones. We looked round for the ploughman dexterous enough to till that stony ground, but nowhere could one be seen.

The castle of Salkad, long the most prominent object in an extensive range of vision, now appeared all the more imposing when contrasted with the vast number of high walls it overlooked. Before our arrival in the immediate neighbourhood of these structures we passed many groups of tents, belonging to a tribe that is known by the comprehensive name of Jebelyah, who act as herdsmen for the Druzes. When we entered the town, it was sometimes difficult to tell what was a wall pure and simple or part of a house. And only when standing on the roof of some habitation, or the castle-hill, is it possible to determine where the houses begin in the wall that surrounds the homestead; even stone windows have in some cases been used to patch up a broken wall. We quartered ourselves on the sheikh, who has a fine medâfeh ("guest-room") as the shelter of his roof offered most protection. After paying our respects to him, we had to answer the usual questions before we could rest in the contemplation of a supper equal in importance to the room and rank of its proprietor. He was a venerable old man with a stately presence, his long white beard and portly figure adding materially to the dignity of his bearing. But all who have heard the name of El Atrash, will recognize in this sheikh one of the most important chiefs of Jebel Druze. Indeed, we were informed on more than one occasion that Mohammed El Atrash was the greatest sheikh of all, and if we may judge by the deference paid to him, and his haughty bearing, there is more than a grain of truth in the statement. His hospitality is beyond reproach, for I was never served with a better dinner, and I have sat round many a trencher on the east of the Jordan. After the meal was over, and we were comfortably reclining on carpets spread on the mastabeh round the room, we were quickly surrounded by a crowd of eager questioners, many of whom have still the idea that the English are of the same family as themselves, and these welcomed us over and over again.

My friend H——'s medical knowledge, accompanied by a stock of the most useful medicines, was of great service. A crowd of patients soon gathered round him, the sheikh's case being taken first, as he had been suffering for fifteen days from a complaint that required but a simple remedy. One youngster wanted some freckles removed from his face, and the sheikh's wife sent for some medicine to fasten her loose teeth. I never heard of diseases so manifold and curious as we found there. Our doctor's reputation increased, more especially when on the morrow the health of the sheikh had improved; but his good offices were recognized the same evening, and that night he slept under a coverlet of silk, while the rest of us had to be content with one of cotton.

Our arms were given to us when all retired to rest for the night, and we slept in peace. In the morning we were early at work exploring the city, though H—— was detained by patients until he handed over a quantity of English salts, quinine, and opium pills to the sheikh, with instructions for future use. The largest building in Salkad is the house of its sheikh, and it has only recently been rebuilt and enlarged to its present dimensions. The only other structure that is larger than an ordinary dwelling is a ruined mosque with a small minaret, similar in style to the one at Amman and another in Ajlun, the only three their kind in the country. They are polygonal, and much more neatly built than the common square ones of the Hauran, none of which are earlier than the twelfth century.

The houses are spacious, but not to be compared with those at Umm el Jemal for either size or skilful construction, but the stone doors and windows are unequalled for beauty and symmetry of carving. All the walls of the yards and gardens are very high, and it was impossible to see more than stone walls or stone doors and windows without the permission of the householder, and this was by no means readily granted. There is only one wide street, and that is not more than six yards across, but it is set evenly with stones, and appears to be a part of the Roman road that is so plainly seen running to Bosra in one direction, and the desert in another; all the other streets are little better than narrow lanes. The only way to see the city, or town as it may now be called, is to ascend the castle hill and view it from the ruin on the summit. The path above the houses is steep, and the old fortress is only reached with difficulty over the cinders that cover the track and crunch beneath the feet. The enormous mass that still overlooks the town is surrounded by a dry moat, which is the natural mouth of an extinct volcano. The castle was erected on the heap of basalt that fills the centre of this hollow in the conical hills. It is approached by a bridge that crosses this moat from the edge of the crater, which is covered with volcanic ashes that resemble the half-burnt coal of an English fire-grate. On one side, the outer wall that covered the rock had fallen down and left the natural rock foundation exposed to view. The stones that cover the face of the castle are not larger than those used in other buildings; in fact, the medâfe of the sheikh is built of the stones that fell from the castle wall. But in the interminable mass of ruined vaults, galleries, and passages that fill the interior, there are many stones of great size, on some of which are carved eagles and other figures, and on the outer wall near the gate are two lions facing each other, and a palm tree. Many inscriptions are built in the wall, but too high to read or copy; others are on stones strewn over the central mass, many of which are Cufic. I photographed one built in the wall over a broken stone window, and, though it is not very perfect, it is of great interest, as it provides us with a clue to the builder of the present structure. I have shown it to my friend, the Rev. J. E. Hanauer, and after a careful examination he gave me the appended note.

That there was a fortress on this hill before the Saracenic conquest can be easily proved by the massive stones in the foundations of the interior. We may naturally suppose, too, that a king who possessed cities fenced with high walls, gates, and bars (Deut. iii. 5) would not neglect to utilize for defensive purposes the conical hill that overlooked the most eastern city of his dominions (Deut. iii. 10), and commanded a view unequalled for extent in the whole of his kingdom.

I took four different photographs from this ruin, showing the country in all directions, and as I used the smallest stop, I was able to bring into the picture a distance of ten miles. They are not quite as good as I should have liked, but they give a fair idea of the town and contour of the country. The most striking of all is that representing the city lying along the western slope of the hill, about 300 feet below the castle. All the buildings seem alike, not one being larger than an ordinary dwelling-house, the most notable being the one, belonging to the sheikh, with the arches towards the left-hand corner. In this Salkad differs from the other ancient sites in the Hauran. There is not one building that seems to have stood in its entirety even for hundreds of years, except the castle. There is neither temple nor church, unless we include a small building with an apse now used as a house; even the small minaret before mentioned is lost in the numberless walls that represent the town. Yet we know that this is the site of a pre-Israelitish city; my remarks on Umm el Jemal will therefore apply here, with this difference, that the same name is still attached to it, and not lost like that of the other city. I am very much pleased to find that my photograph of this ancient city escaped the fate that overtook some others, as it shows how necessary that the reports of travellers should be supplemented in this way. One traveller who visited this city speaks of "palaces" ('Giant Cities of Bashan,' p. 76), and on p. 194 of Buckingham's 'Travels among the Arab Tribes,' there is a picture of Salkad, in which a bridge of four arches crosses a river at the foot of the castle.

The view of the surrounding country from the top of the castle wall is a very fine one, but the "towers of Beth Gamul" cannot be seen "faintly on the horizon." There is only one tower, and it is no higher than the houses that surround it. Bosra is not visible, and it is scarcely more than half the distance, but the Roman road leading to it can be seen as plainly as if it was an English turnpike. The same road runs to the south-east, and is only lost from view where two little peaks on the horizon shelter the last town marked on any map—Imtan, ten miles away (three hours). The Druzes say it continues still further, as they have ridden to Bedawin, ten hours beyond Imtan, to a city called El Azrak, where there are palm trees and running water; and the road does not stop even there, but may be followed for days into the desert.

The population of Salkad is now over 1000, and is composed chiefly of Druzes, but there is a sprinkling of runaway Moslems and Christians who have been compelled to make it their city of refuge. No soldier or Government official has even been near this town, so they are perfectly safe as long as they give no cause of offence to their neighbours. In the stony wilderness of the surrounding country, there are fig-trees and vines; apricots, peaches, water-melons, and potatoes are grown, besides abundance of tobacco and plenty of corn.

M. Waddington has published twenty-five inscriptions found here, but the name of the city is not mentioned in one of them. It is, however, found in a Nabathean inscription discovered by De Vogüé ('Inscript. Nabat.,' No. 6). Besides some which I afterwards found in Waddington, I copied the following inscriptions, hitherto unpublished:—

ΟΥΟΙΚΟ
JΜΝΙΙϺЄ
ЬΡΙΑΝ(ϒΑ
ΘΔΝΑΙΟΝ
CЄΠΑΡΧCΙΑC

On the floor of the sheikh's house.

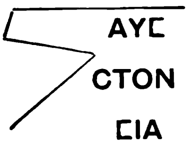
+ΔΥΤΙΙ

On the floor of the sheikh's house.

ΟΥΚΑΤΤΙΟΥΤΟΧΝ
ΟΡΔΙΝΑΡΙωΝΟ·Π·Є
Є3ΑΝΔΡΟΥΑΧΒΡΙΛ
ΖΗΝωΝΟЄЂЄΡΙ
Υ ЄΝЄΤΙCΧΠΡЦ
ΝΔΥΤωΟΖΗΝω
ΤΑΟΝΟΧΑΤΑΤωΝ
-ΚΑΙΟΔИΜΟCΚΜ

Slightly broken at the end.
One line missing.

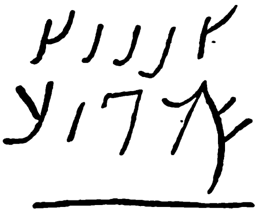
On the floor of the sheikh's house.



A broken stone, large letters, near sheikh's house.

ΗΡϽΓΔΤΟΧϭΙΝ
ΒΡΙωΤΗΝΡΟΓΟΙ
ϭCΤΗЄ·Π·ΔΧ Ι
ΘΔΙ·Π·ΔΧΡΗΧΙ Λ
ϭΗΛΟΝЄΙΝΔΙ.

In a courtyard.



On the floor of the "guest room."

Jerusalem, October 23, 1893.

Dear Mr. Lees,

Thank you for the photograph, enlarged from a smaller one, of the inscription over a gateway of the castle at Salkhad.

The photographic reproduction of this inscription is most opportune and important, because it proves that the copy made by Burckhardt, and published on p. 183 of his 'Travels' (German version, Weimar, 1823) is incorrect, and also because it confirms the correction, as far as it goes, suggested by Dr. Van Berchem, of Geneva, in his footnote 3 on p. 90, heft 1 and 2, vol. xvi. of the Zeitschrift of the German Palestine Exploration Society.

The inscription, therefore, *as far as it can be made out*, reads—

سم الله الرحمن الرحيم امر بعماره هذا البرج
الامير * * * * * *
في ايام الملك العادل سيف الدين ابي بكربن
ايوب

"In the Name of God the Merciful, the Compassionate. The building of this tower was ordered by the Emir." The name cannot be made out from the photograph, but Van Berchem suggests that it is that of the well-known historical personage and great builder, عز الدين ايبك "Izz-ud-din Aibek," who was lord of Al Salkhad about the time indicated in the inscription, viz. "In the days of Malik-ul-adil Saif-ud-din" (not "Saad-ud-din," as Burckhardt has in his copy) "Abi Bekr bin Ayoub." The year cannot be made out from the photograph; but we know that Saif-ud-din, the nephew of the famous Salah-ud-din (Saladin), had made his son, Al malik ul Mu'azzam, his heir-tenant at Damascus, and that the latter appointed Aibek, his mamlook, to the lordship of Salkhad, or Sarchad, as Arab writers sometimes call it, in A.D. 608.

We may therefore safely assign the inscription to the end of the sixth or the commencement of the seventh Moslem century.

I remain, dear sir,
Yours faithfully,
J. E. Hanauer.

NOTES IN EASTERN MASHONALAND.

By W. ALFRED ECKERSLEY.

In April, 1893, the writer was entrusted with the task of surveying and reporting upon a proposed line of railway from the Anglo-Portuguese frontier in South East Africa to Salisbury, Mashonaland. The survey party reached Beira in June, and at once proceeded up the river Pungwe, on their way to Chimoio.

From Beira, by river, to Fontesvilla, the starting-point of the Beira railway, is a journey of 45 miles; it occupies, in the largest of the three or four river-steamers, and under favourable circumstances, about six hours. According to a survey completed in November last, the distance from Beira to Fontesvilla, by the course of the proposed railway extension, is 37 miles 1 furlong.

On the way up the river seven hippopotami were seen; they are said to be plentiful in the tidal reaches of the Pungwe.

Fontesvilla is situated on the south-west side of the river. Opposite the settlement the river-banks stand from 5 to 6 feet above high-water level of spring tides. The ordinary rise and fall of tides is 6 feet. During heavy floods the river overflows its banks, covering the flats on which the town is built with from 1 to 3 feet of water; the river Muda, flowing at the back of Fontesvilla 8 miles or so to the westward to join the Bisimiti and Pungwe, brings down a large proportion of the flood water.

At Fontesvilla the Pungwe is 430 feet wide; its banks of stiff clay and mud rise perpendicularly above the river, and are very subject to erosion by the quickened flow of the flood waters. The river usually runs sluggishly, carrying with it large quantities of sand and mud in suspension. Numerous shoals and a constantly shifting channel render navigation extremely difficult even for the light-draught steamers in use.

FONTESVILLA, PUNGWE RIVER.

The neighbourhood of Fontesvilla is very unhealthy; the depressing climate, together with the constant malaria rising from swamps and river, were the cause of a disastrous mortality amongst the staff of engineers and others employed upon the construction of the Beira railway. In June the nights are distinctly cold, while the heat of the sun during the day is very powerful; the wide range of temperature during the twenty-four hours undoubtedly is an additional cause of fever and sickness.

The Beira railway was completed last November (1893) to [a point, measured along the centre line of the railway, 75 miles from Fontesvilla in a north-westerly direction.

The temporary terminus of the railway, usually known as the "Seventy-five mile peg," is 43½ miles from Chimoio by the line recently surveyed for the proposed extension to that point; the distance measured in a straight line is very considerably shorter. The Seventy-five mile terminus is connected with Chimoio by a waggon road lately cut through the forest, thus bringing the railway into direct communication with the "Selous" road to Massi-Kessi, Umtali, and Salisbury. The terminus is unfortunately situated well within the limits of the district infested by the "tetse-fly," thus rendering imperative the early extension of the line to Chimoio, or even further to the west. Chimoio, up to the present, has been entirely free from the fly. The doubt has been expressed that the presence of a large number of horses, oxen, and other animals at Chimoio, attracted thither by the facilities of transport offered by the railway, might in its turn be the means of attracting the destructive fly to that place. This doubt has now become a certainty, recent letters containing the news that the dreaded fly had actually made its appearance in Chimoio.

It is interesting to note that two ponies, purchased in Natal for the use of the survey party, passed through Beira, Fontesvilla, and the intervening "fly-belt," to Chimoio without suffering any ill effects; they served the party until the conclusion of the work, and were finally sold at a profit. No particular precautions against the "fly" were adopted, except occasional brushing with green boughs. It is quite certain that the tetse-flies settled on the horses in considerable numbers, and remained quite long enough to allow of their biting. It was only during one day, however, that the flies were present in large numbers; this was on the course of the railway, between 38 and 45 miles from Fontesvilla.

For the first 20 miles the line of railway traverses a perfectly flat, nearly treeless, alluvial plain, covered with long grass and teeming with big game, including lions, buffaloes, most of the South African species of antelope, wart hogs, and wild boars. At a distance of 25 miles from Fontesvilla the foothills are reached. Here the surface of the country becomes slightly broken, and is covered with forest. The Chiruvu Hill Station is situated at mile 35, at an elevation of 637 feet above the sea. The station consists of half a dozen huts, built by the contractor for the accommodation of his staff, and lies at the foot of two conical kopjes, covered from base to summit with a dense growth of low trees and long grass. From Chiruvu hills to the terminus of the railway at mile 75, the country traversed is of a very uniform character and appearance; rising gradually to the westward, the ground is broken by deep valleys, formed by numerous streams tributary to the Muda and Mudichiri rivers, and is thickly wooded with the acacia tree, locally known as "mopane," which, however, attains to no great height.

The forest is interspersed with open spaces and park-like stretches of country; there is little undergrowth except the long reedy grass, and bamboos and small palms are scattered but sparsely through the district.

Between mile 75 and Chimoio the country is similar to that previously described, but is more broken; streams, flowing with an abundance of clear cool water throughout the dry season, have formed deep narrow valleys, from which the hills rise steeply on either side.

Before the construction of the Beira railway, the route usually taken from Fontesvilla to Chimoio led by the river Pungwe as far as Mapandas, and thence by native trails through Sarmento and Mandigos. As soon as the railway works were commenced, the old route was abandoned. Landing at Fontesvilla, travellers follow the line for 63½ miles, and from this point take a native trail to the north-west, *viâ* Mandigos, or another slightly more to the southwards, passing through a number of scattered kraals. The southern path is still preferred by native porters, as it affords better opportunities for obtaining food and accommodation on their march. It has become the habit of the natives of the interior engaged in porterage to and from the coast, to hide or bury their supplies of meal on this route on their way down, and pick them up for use on their homeward journey.

This route was chosen by the writer. Leaving the railway at "Charlton's Camp," which is 63½ miles from Fontesvilla, and stands 1200 feet above the sea, the head waters of the Mudichiri river were soon reached; at the point of crossing, the stream was 15 feet wide, and flowed in a series of falls and pools over a rocky bed. Three or four miles further to the north-west lies a small kraal of a dozen or more huts, known as "Umbobos."

Twelve to fifteen miles in the same direction was another kraal, surrounded by extensive patches of cultivated land. As far as could be ascertained, this village is known as Mashangombes. A march of 18 to 20 miles in the same general direction brought the party to Chimoio. The whole distance by this route, from Fontesvilla to Chimoio, is estimated as slightly over 100 miles; the distance by the line of the Beira Railway survey is 118½ miles. The route described is unsuitable for travelling on horseback, on account of the frequency of bogs and the narrow precipitous paths leading to and from the stream-crossings. It was found necessary to bridge some of the stream-crossings, where boggy, with a mattrass of trees and boughs covered with smaller branches and long grass. One of the horses caused a tiresome delay by getting hopelessly bogged. It was finally extricated, after considerable hard work, by one gang of native porters hauling upon it by ropes from the bank, whilst another gang, up to their armpits in water, levered the helpless animal forward little by little with stout branches, having first tethered its legs to prevent it kicking. The trails are narrow, and run, for the most part, through the long grass. Walking in the earlier part of the day is disagreeable, on account of the drenching dew, and later on account of the heat, as scarcely a breath of air can penetrate the dense walls of grass, which in the coast districts reaches an average height of 8 to 10 feet. In walking, the natives place one foot precisely in front of the other, and leave a slippery track of trodden grass only nine inches or so in width to walk upon. The streams are clear, and run with a rapid current over rocky beds, except where bogs are formed by an accumulation of soil and rank vegetation.

At Chimoio the party met the native chief of that name, and made him some small presents. He is a rather disreputable-looking old man, with a sharp cunning look, and suffers from lameness in one leg, which is badly crippled by accident or disease. Chimoio has cultivated a taste for strong drinks, and his desire to gratify it often brings him to the European quarter of the village. This quarter now consists of three or four general stores, built in the native manner, round which a number of waggons engaged in transport service are usually outspanned.

The writer's survey was commenced at Chimoio, the line and levels being connected with points left by the Beira railway engineers.

The total distance of 412½ miles from Beira to Salisbury by the line of the proposed railway may be divided as follows:—

Beira to Fontesvilla (by land)	37½ miles.
Fontesvilla to railway terminus	75 ,,
Terminus to Chimoio	43½ ,,
Chimoio to the assumed Anglo-Portuguese frontier at the second ford of the Meneni river	56½ ,,
Frontier to Salisbury	200 ,,
	412½ ,,

By the waggon road this distance is reduced to 381 miles.

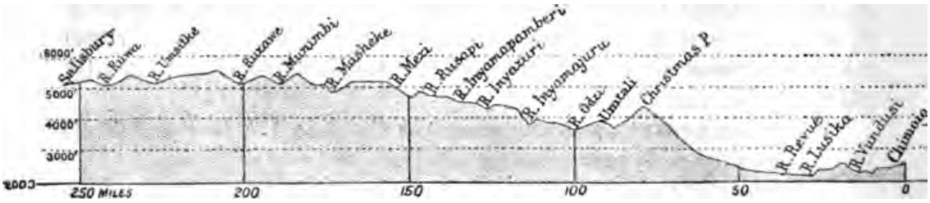
The elevations above sea-level of the most important points on the survey are as follows:—

Chimoio	2398 feet.
Revue river	2145 ,,
Christmas Pass	4450 ,,
Umtali	3705 ,,
Odzi river	3445 ,,
Masheke river	4785 ,,
Highest point on line between the Umseetkwe and Ruzawe rivers	5620 ,,
Salisbury (foot of Kopje)	5050 ,,

The accompanying illustration (p. 32) shows a longitudinal section of the country traversed by the survey.

Between Chimoio and Umtali the waggon road follows a winding course, in order that, by keeping as much as possible upon the high ground of the watersheds, the frequent crossing of streams and swamps may be avoided. The survey followed the same general direction as the road, crossing it more than once.

For three-quarters of the distance to Umtali, the country is covered with thick woods of acacia or "mopane" trees. In certain localities, especially between the rivers Vundusi and Lonodsi, these trees grow to a considerable size, the largest attaining a height of 70 to 80 feet, and a diameter, measured 4 feet above the ground, of from 2 to 3 feet; by far the greater number, however, are small trees, varying in height from 15 to 30 feet, and in diameter from 6 to 9 inches. Large open spaces, usually on either side of the stream, are met with in the forest. There is very little jungle except long grass. In the deep "donga" bottoms, a matted mass of reeds and bramble, very difficult to force a way through, is often found. The surface of the country is gently undulating, except where it falls sharply to the larger streams. The rivers crossed in this district are Vundusi, Lonodsi, and Lusika, streams 20 to 25 feet wide, and 2 to 3 feet deep at the beginning of the rainy season. They are all subject to sudden rises.



LONGITUDINAL SECTION ALONG MR. ECKERSLEY'S ROUTE FROM CHIMOIO TO SALISBURY.
Horizontal Scale 1 inch = 300000 ft.
Vertical Scale 1 inch = 6000 ft.

The soil is either of a red or grey colour. The former indicates that it is composed of the detritus of slates and other metamorphic rocks; the latter points to a granitic origin. It overlies the granite or greenstone rock, with a depth varying from 3 to 30 feet. On the watersheds and in the river-channels rock crops out plentifully.

The line of survey crossed the Revue river a short distance below the road ford. The river has here a rapid current and a gravel and sandy bed, with water from 2 to 3 feet deep, spread over a width of about 60 feet. Above the ford the bottom is rocky, and rapids alternate with deep pools, in which a number of crocodiles make their home. One was shot by a member of the party. In spite of the presence of these reptiles, the "Shangan" boys employed upon the survey bathed fearlessly, taking evident delight in swimming and diving in the deep water. Between the Revue and the town of Umtali, the vegetation is very similar to that already described, except that the open spaces are larger and the woods less thick. The trees also present a greater variety. Palms and bamboos are very plentiful, but the acacia is still by far the commonest tree. The "makoona," a hard-wood tree with a leaf resembling the bay; the red pear; the wild fig, bearing a good fruit; the chestnut; the "mahobohobo" or wild loquat, also fruit-bearing, are all found in the valleys and on the lower slopes of the mountains, growing singly or in small clumps. Both the black and white thorn grow in this district, their presence being a nearly certain indication of wet or swampy ground. Of all the varieties of native timber, only one, known as "redwood," has been found capable of resisting the ravages of the white ants and borers, when used for purposes of construction. It is, unfortunately, a tree of small dimensions, hard to work, and only found in very limited quantities.

Following the Revue as far as its junction with the Meneni, and then the valley of the latter stream, the ground rises with an even ascent, until within ten miles of Christmas Pass. Here the Meneni becomes a mountain torrent, and the waggon road rises sharply alongside it to gain the first step in the ascent. For two miles the road runs along the low watershed of the Sikura river, flowing in a south-westerly direction to the Odzi, while the Meneni flows eastwards. It then follows a steep and winding course until the summit of Christmas Pass is reached.

Between the Revue ford and the town of Umtali the road does not cross any important rivers. Numerous short streams, flowing down the mountain flanks, have scored deep ravines in the alluvial soil of the valley, and form a series of awkward crossings on the waggon road. The Meneni is twice crossed, the fords being only two miles apart. At these crossings the water is from 12 to 15 feet wide in the dry season; but the great depth and width of the river-channel shows that in the rainy season it carries a considerable volume of water. At the second ford the Mozambique Company have established a station, which is intended to form the nucleus of a frontier town. The station is in charge of two officers of the Portuguese army charged with general administrative functions, and a custom-house officer to check the passage of goods across the frontier.

The soil of the valleys of the Revue, and its tributary streams, the Meneni and Zambusi, consists of a dark red alluvial loam mixed with a large quantity of vegetable matter. It produces maize, rice, millet, manioc, tobacco, cotton, bananas, vines, lemons, ground or monkey nuts, indiarubber, and gums.

The five first-mentioned crops are by far the most plentiful, the others growing for the most part wild and in inconsiderable quantities. The advantages, for the production of tropical crops, offered by this district, comprise an agreeable climate at an elevation of 2000 feet above the sea, a deep and excellent soil, and an abundance of water, all the valleys being watered by streams capable of yielding a plentiful and continuous irrigation supply.

Between Chimoio and the foot of the Christmas Pass range, the commonest rocks are gneiss and granite, the gneiss being particularly prevalent in the neighbourhood of Chimoio. The character of the formation changes near the mountains, which are composed of metamorphic rocks superimposed on a granite base.

After reaching an altitude of 4450 at Christmas Pass, the road falls rapidly to Umtali, situated at a distance of six miles from the summit, and at an elevation of 3750 feet above the sea.

A fine view is obtained from Christmas Pass. The mountain range extends to the east and west; out from it rise peaks of naked granite and greenstone, their bases and sheltered clefts covered with acacias and other trees. Looking back, one can trace the steps by which the road has reached the summit, flanked by thickly wooded hills which trend to the eastward to culminate in the conspicuous Vumba mountain; looking forward, the eye follows a low spur running at right angles to the main range, until it rests upon the houses of Umtali, built on a gentle slope falling to the river Inyamgambo. A wooded kopje, 1000 feet high, rises abruptly at the back of the town.

The "high veldt," or upper plateau, of Mashonaland differs from the lower country in being more open and free from trees. The whole plateau is covered with long grass growing to a height varying from 4 to 8 feet; woods resembling large plantations are scattered with great frequency over it. The surface of the plateau is formed into a series of well-marked depressions by the rivers flowing to the south to join the Sabi. The principal rivers crossed by the road are the Odzi, Inyamajuru, Inyazuri, Rusapi or Lusapi, Mezi, Mashoke or Umsheke, Munimbi, Ruzawe, Umsitkwe, and Ruwa. By far the most important of these are the Odzi and Masheke, most of the others being tributaries of these two larger streams. These rivers were only seen by the survey party in the dry season, but flood-marks and other indications determined the area of waterway necessary. For the smaller crossings spans of from 25 to 50 feet were decided upon, while for the larger 75 to 120 feet openings would be necessary.

Where the rock is not actually exposed in the river bottoms it closely underlies the soil, so that excellent bridge foundations may be relied upon.

The Odzani, or little Odzi, is a stream with a rapid fall, and brings down a fine body of water to the Odzi; at the ford on the road between Umtali and Umtasa's kraal, it is 40 feet in width and from 2 to 3 feet in depth. The current flows so swiftly as to make it difficult for a horse to maintain its footing on the slippery rock bottom. During the rains the Odzani frequently becomes unfordable.

All the rivers crossed on the high veldt have a quick fall. They form a series of rapids and pools alternating with reaches of sluggish water, where the channel is dammed by soil and masses of vegetation; in the latter cases the banks are usually precipitous, and the fords boggy and treacherous. Very little sand or gravel is found in the river-beds. The water is usually cool and good to drink, except where it has been lying a long time stagnant. Crocodiles, of a fair size, inhabit the pools, but very few fish, except the smallest fry, were noticed.

Swamps are formed in the valley-bottoms, on the slopes flanking the streams, and around the springs that feed them, wherever the subsoil drainage is checked by an impermeable floor beneath of rock or clay, and by intrusive walls or dykes of rock. The drainage of the swamps would not, as a rule, be a matter of much difficulty, as their depth is usually not excessive. The exhalations rising from them are certainly a fruitful cause of the prevalence of malarial fevers.

RIVER ODZI, AT JUNCTION WITH THE RIVER ODZANI.

The soil of the plateau between Umtali and Salisbury consists, for the most part, of decomposed granite, and is, in consequence, of a rather poor and sandy nature; its average depth is from 3 to 5 feet. Large areas of red soil are, however, frequently met with, and are much more highly esteemed for agricultural purposes. The Mashonas on the plateau grow maize, millet, rice, beans, ground nuts, sweet potatoes, pumpkins, tomatoes, and a little cotton; tobacco is also grown in the red soil. The long grass which covers the whole of the plateau is burned down in the early autumn. Almost immediately after, and without the help of rain, a tender young grass springs up amongst the blackened tufts, forming good and welcome pasturage for cattle. A few wild flowers also help to carpet the charred surface of the veldt. Here, also, the "mopane" tree is commonest, but rarely attains to a height of more than 25 feet. When first its leaves make their appearance they are bright red; this soon changes to a rich autumnal brown; passing through some further shades of that colour, they finally assume a green of equal brilliance to the spring leaves of most of our English trees. Masses of these trees in the various stages of change form a remarkably picturesque effect; the strong contrast in which the brilliant reds and greens stand out against the background of the blue-grey granite is particularly striking. The wild loquat, wild fig, kaffir orange, sugar bush, and kaffir-baum grow plentifully on the high veldt. From the gnarled branches of the latter tree the natives manufacture their bowls and platters, and the large wooden mortars for pounding the maize and millet into meal. The kaffir-baum has a bright red flower, but very little foliage.

During the dry season distances in this part of the country are remarkably deceptive, objects appearing to be much further off than they really are. This particularly striking fact is, in all probability, due to an opaqueness in the atmosphere, caused by the smoke of the constantly occurring grass fires. After a sharp rain, the dim purple haze gives way to a bright clear sky.

The climate of the plateau in the dry season is good and bracing; the early morning air is particularly exhilarating. The range of temperature during the day is often extreme; the thermometer frequently marked 3° to 4° of frost in the early morning, and the water in the basins was frozen hard; while later in the same day the mercury indicated as much as 80° Fahr. in the shade. The mean temperature noted in July and August was 65° Fahr. The midday heat is nearly always tempered by a cool easterly breeze. The rainfall noted in Salisbury for 1891–92 by Major Forbes amounted to 33·84 inches, and rain fell on seventy-five days; the extremes of temperature observed by him were 93° Fahr. in October, 1891, and 34° Fahr. in June, 1892.

The geological formation of the country along the route surveyed is very uniform, the rock being almost entirely granite, with occasional dykes of greenstone. The granite kopjes scattered over the whole of the plateau range in height from 50 to 1000 feet. In many districts, owing, doubtless, to seismic disturbances and the action of the weather, the rocks assume the most varied and fantastic shapes, and lend to the landscape of Mashonaland a weirdness quite its own. Thirty miles from Umtali, the waggon road crosses a considerable range of hills, in which greenstone of a porphyritic nature occurs in abundance. Four miles east of Salisbury the character of the formation changes, the granite being here overlaid with ironstone shale. The Salisbury kopje, which rises to a height of 170 feet above the main street, is composed of magnetic ironstone shale, highly indurated and laminated, and showing evident signs of intense folding and crushing. No limestone has been found between Umtali and Salisbury, or indeed anywhere in this part of Mashonaland. The gold-bearing reefs of the Umtali district occur in a belt of metamorphic rocks, extending east and west from Umtali for a distance of over 40 miles; this belt varies in width from a mile and a half at the Odzi, to 8 or 10 miles at the Crow's Nest, a point on the Penalonga ridge, halfway between Umtali and Massi-Kessi. The course of the railway again enters a gold-bearing zone in the neighbourhood of Salisbury.

The members of the survey-party lacked both the leisure and the experience necessary for big-game shooting; their exploration of the country, nevertheless, often led them far away from beaten tracts, and afforded more chances of seeing game than fall to the lot of an ordinary traveller. Nearly every day one or two antelope were put up, and not rarely they were seen in herds of from twenty to thirty. The best game country traversed lay between the Odzi and Inyazuri rivers, 6 or 7 miles south of the waggon road; this district was entirely uninhabited. Near the river Mezi large numbers of baboons, of all sizes and ages, were met with sporting amongst the rocks, trees, and boulders of the kopjes; they evinced very little surprise or fear at the near approach of man. Partridges, doves in very large numbers round the patches of

MOUNT MONTIKWIRI.

cultivated land, duck and wild geese on the Odzi and Masheke rivers, were the feathered game most frequently noticed. Occasionally huge birds, locally known as "pows," were seen on the distant veldt; these birds are not infrequently mistaken for ostriches by the inexperienced.

The natives display considerable ingenuity in the construction of game traps. For small game they employ a sprung branch attached by a string of bark fibre to a noose hidden just beneath the surface of the ground, or carefully constructed alley-ways, close-fenced on both sides with upright sticks, leading through a gap to a trap formed by a heavy limb ready balanced to fall upon the quarry as it passes.

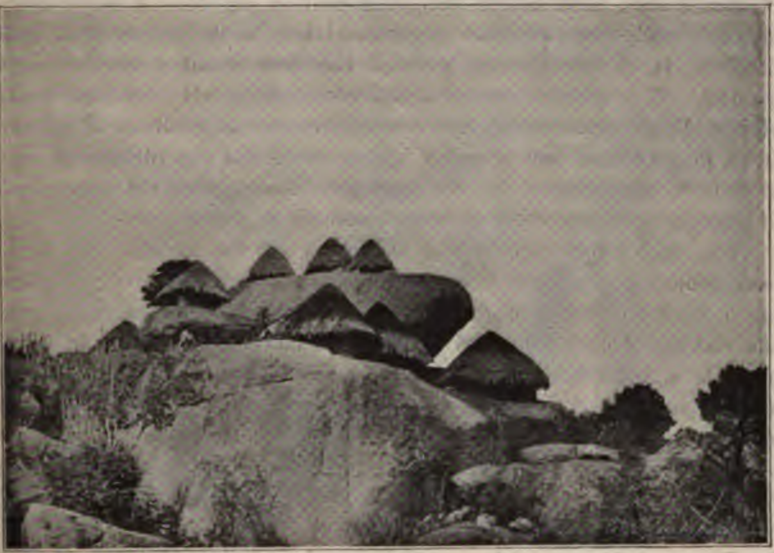
Considerable time and trouble are taken in the preparation of the big-game traps. The site chosen generally lies at the top of a valley between two kopjes. A fence is constructed across the valley, and so far up the precipitous sides of the kopjes as to prevent the escape of the driven game at either end. In one instance the fence was three-quarters of a mile or more in length; it was strongly constructed of posts let into the ground at intervals of 8 to 10 feet, forked at the upper end for the reception of a stout rail. The spaces between the posts are filled in with heavy brushwood placed vertically, and laced together longitudinally, the whole forming a most formidable barrier 5 feet 6 inches in height. At intervals, varying from 20 to 100 feet, the continuity of the fence was broken by gaps, left to tempt the hard-pressed game to pass through them. In these gaps pits were dug; they measured 10 feet in length, 2 feet wide on the top, with shelving sides, narrowing in to 9 inches or so wide at the bottom, and from 6 to 9 feet deep. The pits were covered with boughs laid lightly across them, and their treacherous nature was finally concealed by a covering of grass. A very necessary warning to give to inexperienced travellers in Mashonaland, is to beware of any gap in a fence, as these dangerous traps are scattered far and wide over the surface of the country.

The insect pests common to the tropics, such as jiggers, ticks, sand-flies, and mosquitoes, give very little trouble in Mashonaland, or on the journey to and from the coast. White ants and borers are the worst enemies of the settlers in the high country, while the tetse-fly causes incalculable mischief in the low-lying districts.

Although the party was scattered and travelled over much untrodden ground, the number of snakes encountered was very small. Two puff-adders were seen, one of which was killed. These two, and three or four smaller snakes of a species not recognized, were the only ones observed during the five months spent in Mashonaland.

The country on the line of survey is thinly populated; many days were passed without meeting a single soul. The sparseness of population was especially noticeable between Umtali and the river Inyazuri. Outside the large kraals, such as Umtasa's and Makoni's, the chief centres of native population on the route travelled are on the banks of the

Rusapi river south of the road, on the Ruzawe river south of the road, and in the valley of the Makabusi near Salisbury. The outlying kraals, as a rule, consist of a dozen or more huts; the number of granaries, resembling small huts, gives an air of greater importance than they really possess to many of the villages. Large patches of cultivated land now abandoned, stone foundations of deserted villages, extensive forest clearings met with all over the country, prove that at no distant date Mashonaland was much more thickly populated than at the present day, although no doubt these features may be partly accounted for by the nomadic character of the people.



MASHONA KRAAL ON RIVER MEZI.

Labour is now scarce on the high veldt. The "boys" obtained from the neighbouring kraals are largely supplemented by men from Gorongoza's country near the Zambesi, and from the "Shangan" country near the coast. The latter "boys" are the most highly prized for the work in the mining districts, as they are more intelligent and enterprising than the timid Mashonas.

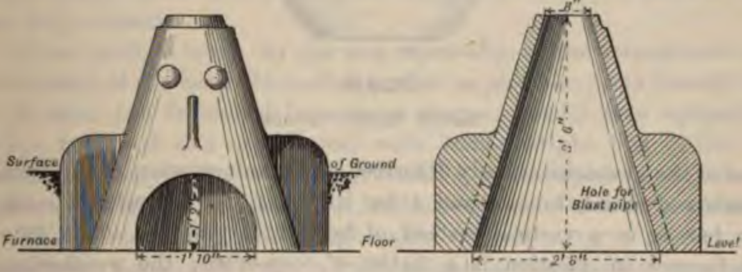
Apart from agriculture and cattle-breeding on a scale large enough to supply their own scanty wants, the industries practised by the Mashonas are of little importance. Grain is stored by the natives in circular granaries, which are miniature copies of their own huts. Near the source of the Inyazuri river the party unexpectedly came across a collection of fifty or sixty granaries, belonging to a neighbouring village, and in charge of two watchmen. The clean surface of the granite rock formed the floor of the granaries; they were perched on boulders, without regard to order, where a flat surface offered a favourable foundation. Their circular walls consisted of wattle and daub; three or four stout poles with forked ends protruded above the rest of the wall to receive the ribs of the umbrella-shaped roof, this roof being first covered with a plastering of mud, and then thatched with long grass. Some of the granaries measured 6 feet in height to the eaves, and 6 feet in diameter, but they varied in size to suit the area of level rock available on the several boulders. The interior is partitioned, by walls of wattle and daub, into three or sometimes four compartments, to separate the bulk of the grain. The building is covered with an inner roof of sticks plastered with mud before the outer roof is put on. A small door or manhole made from an oval or round slab of rock, and with a handle fitted to it, is let into the wall of the hut about 4 feet above the ground. The outside ornamentation of nearly all the huts consists of mouldings representing the female breast—an emblem of plenty—and a longitudinal bar in relief above them, the significance of which is open to conjecture. In the aggregate these granaries were capable of storing upwards of six thousand bushels of grain.

The trades followed by the Mashonas of the present day include basket-making of a particularly strong and superior quality; the weaving of bark and cotton fibre into blankets and sacks for carrying grain; the making of bark rope and string; the manufacture of rude wooden utensils and earthenware pots for household use; and the softening and preparation of skins for wear. Each community appears to be self-supporting and to manufacture its own utensils and grow its own supplies; for this reason there is very little interchange of produce between villages, except, indeed, in the case of tobacco, which is exchanged for meal and other necessaries.

The manufacture of iron articles, such as knives, hoes, assegais, and axes, is at the present time confined to the neighbourhood of Mount Wedza, some distance to the south of the Salisbury road, where there are extensive deposits of iron ore. The Mashonas and others travel long distances to the district to make new purchases, or to have repairs done to their tools and weapons. A line of rough shelters situated a few miles apart was pointed out, on one of the trails running to Mount Wedza from the north, as having been established by the natives travelling to and from the iron district with their tools and weapons.

From Marandella, a petty chief living in the neighbourhood of the Salisbury road, two assegais were purchased. Their interest lies in the fact that their shafts and points are manufactured entirely out of Mount Wedza iron. They are ornamented by narrow strips of iron, three-quarters of an inch in width and one quarter of an inch thick, wound round the iron shaft near the ends, with the object of giving both grip and balance to the weapons; these strips prove the extreme ductility of the metal. Mashona smiths have not learned the secret of tempering their metal without rendering it brittle. When the natives, on rare occasions, use their assegais for any serious purpose, it is stated that the weapons either break or bend. The small axes are soft and badly tempered, but, despite this fact, the Mashonas display great skill, quickness, and precision in cutting down trees and lopping branches with them. In a very few days they utterly spoilt the American axes, of superior temper, with which they were at first supplied.

The accompanying sketch shows a blast furnace found during the survey on the banks of the Rusapi river, 10 miles south of the waggon road. There was no trace of modern habitation within 2 or 3 miles of where it was discovered, nor were there indications of the existence of any large quantity of iron ore in its neighbourhood, the nearest deposit, as far as could be ascertained, being in the Mount Wedza district, 40 to 50 miles distant. This fact favours the theory that the ore employed for smelting was a weathered magnetite, which occurs in the neighbourhood in small brown lumps of tolerably uniform size. A lump picked up in this vicinity, on being held over the compass of a theodolite, was found to deflect the needle through 12 degrees. The magnetite, when its size required it, was probably broken up into pieces the size of walnuts and placed in the furnace mixed with charcoal, with a layer of dry wood at the bottom of all to start the fire. It is not probable that any special flux was used in smelting, as no limestone is to be found anywhere in this part of the plateau, but the ash of the charcoal might possibly act as a flux. The fact that charcoal was employed as fuel is proved beyond doubt by a lump of slag picked up close at hand, in which pieces of charcoal are embedded. It is interesting to note that Mungo Park, in his book of travels, describes a process of iron-smelting very similar to the one reviewed here.

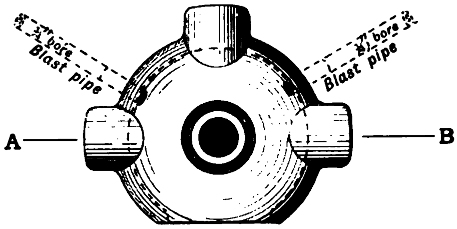


FRONT ELEVATION. SECTION A. B.

NATIVE BLAST FURNACE.

The accompanying sketch clearly shows the construction of the furnace; it is made of blue clay burnt hard, or, more probably, from the earth of the white-ant hills which abound in the neighbourhood.

The blast was conducted through two clay pipes about three-quarters of an inch bore, numerous pieces of which were found lying round the furnace; the bellows used were, in all probability, two goat or buck skins alternately filled with and emptied of air by manual pressure. This method still obtains in the native forges in Mashonaland. As soon as the furnace was charged, the arched opening shown in the sketch was banked up by a door of clay, which was broken down when the smelting operations were finished. The whole process as practised in Mashonaland is very similar to that employed in India and Borneo, as described in Phillips's 'Metallurgy.' An interesting pamphlet by Mr. Thomas Turner, reprinted from the *Journal of the Iron and Steel Institute*, on the "Production of Wrought Iron in Small Blast Furnaces in India," has helped the writer in his short examination of this question. As in the case of the granaries already described, the ornamentation of the furnace consists of female breasts and a bar in relief; in the present instance the bar is in a vertical instead of horizontal position. The date of the furnace in question is a matter of conjecture; the weathering of the clay points to an age of from 15 to 20 years, but the absence of any sign of habitation near at hand possibly indicates an older origin.



PLAN.

NATIVE BLAST FURNACE.

The Mashonas with whom the party came in contact were of a timid, indeed cowardly, disposition. They were scrupulously honest in their dealings—very possibly from no higher motive than fear of punishment; be this as it may, no single case of pilfering from the tents, which were constantly left open and unguarded, occurred during the period spent amongst them. They are, under nearly all circumstances, contented and extremely lively. After twelve hours' work on the survey, they have frequently enlivened the long march home to camp with songs and dances. A cold wind upset their equanimity more than any other discomfort, and when working under such conditions they would seek shelter at every opportunity, and, carrying a lighted brand with them from point to point, would kindle a small fire of dry grass and sticks, around which they would crouch shivering, until ordered to move on.

Like most negroes, the Mashonas are particularly fond of clothing themselves in the cast-off garments of the white men. This habit is deplorable, not only because it transforms a fine savage into a ridiculous scarecrow, but also because the clothes are rarely if ever washed or changed, but are worn constantly through heat, cold, and rain, until their accumulated dirt and unaccustomed warmth have laid the seeds of various skin and lung diseases.

The men are of medium height, their slight build making them appear taller; the average height of those who worked on the survey was 5 feet 4 inches. They are fairly well made, but their arms and chests are not as a rule strongly developed. Their skin has a fine healthy glow, its colour being dark chocolate brown, some shades removed from black.

Native dress consists of softened skins from which the hair has been removed, tucked in, both in front and behind, to a leathern or bark belt. Skins are now rapidly giving way to the cheaper and more easily procured "limbo," or coarse calico. The oil of the monkey nut is used in preparing the skins for wear; it is also employed for cooking and lighting purposes. The women are considerably smaller than the men; they are clumsily built, have coarse, plain features, and from no point of view are they attractive.

Great pride is taken, by the men especially, in the arrangement and adornment of the hair. It is oiled as often as possible; from time to time it is recut and fashioned into queer shapes, usually into upstanding wisps festooned and ornamented with beads, bright bits of tin, and feathers. Many of the women have their heads completely shaved, this fashion, as may well be imagined, adding no charm to their appearance.

The inhabitants of the "high veldt" usually carry a small axe or an assegaî, sometimes both; a knife of native manufacture in a carved wooden sheath, prettily ornamented by fine brass wire woven into patterns, and a snuffbox of similar make, are almost invariably worn slung round the neck by a piece of bark string or leather. In some instances the snuffbox, made of bamboo neatly carved, or consisting of a cartridge shell, is carried in a slit in the lobe of the ear. Near the coast it was noticed that the men carried bows and arrows. Many of the younger men wear round their necks a flat white shell hung by a leathern string; they are averse to parting with these ornaments, which, it is stated, are love-tokens.

The Mashonas display little strength in pulling or lifting with their arms, but are able to carry heavy loads when once lifted to their shoulders. They ease the burden they are carrying by resting it on a stout stick held in one hand in front and projecting over their shoulders behind, and can carry a load of from 50 to 75 lbs. all day, walking, under this weight, from 18 to 20 miles.

Before breaking up camp some sports were organized, money prizes being given to induce the natives to compete. They did not display any great activity, being easily beaten by the white men of the party at jumping, vaulting, and running.

They are good dancers, and take great pleasure in displaying their accomplishments to the accompaniment of hand-clapping, tom-tom playing, and savage chants, with a constantly recurring refrain. Their dances are of a warlike character, descriptive of daring feats of arms. When one is aware that their nature is in reality extremely timid and cowardly, it is amusing to note the bloodthirsty and warlike airs and attitudes assumed by them while dancing. The survival of these dances points to an ancestry versed in warlike pursuits before their subjection by the Matabili, though they may, indeed, have been learnt from the Matabili themselves.

The inhabitants of the plateau are always willing to trade with the white colonists. Whenever camp was pitched in any inhabited neighbourhood for more than twenty-four hours, the natives came in early the next morning, bringing with them meal, maize, pumpkins, eggs, fowls, and occasionally a goat. Twenty or more would come together; sometimes they displayed great diffidence in approaching the waggon. The women invariably took up their position fifty yards or more away in a distinct group, and would there modestly remain unless attracted by a crisis in the inevitable bargaining, or by the display of some particularly tempting trading article. The most useful articles for use in barter were found to be small white glass beads with pink eyes or entirely pink, "limbo" or coarse calico, both blue and white, and coarse salt; the latter is particularly appreciated, and possesses a purchasing power altogether disproportionate to its cost. From time to time the fashion in trading articles changes, and it is found that the natives are particularly fastidious as to the colour of the beads or the quality of the "limbo" offered them.

The common food of the Mashonas is a thick slabby porridge, made of millet meal; of this they eat from two to three pounds a day. They are extremely glad to vary the monotony of this diet by meat of any kind, and it has been found politic by their white masters to keep them in good humour by gratifying this taste once a month or so. Field-rats are hunted and eagerly eaten. When the grass is being burnt, they are driven out by the fire and speared by the Mashonas in the open. Caterpillars—those of the large green silvery kind especially—are gathered from the trees, strung on a bark string, and carried home as a delicacy. Locusts are collected, deprived of their wings, and eaten fried. Wild honey is also greatly appreciated. It is found in large quantities in hollow trees and rocks. The honey-bird leads both men and beasts, with its loud distracting twittering, to the hive it has discovered, with the hope of sharing in the spoils, when the hive has been broken open and the honey exposed. Beehives are fashioned out of bark by the natives, and are often to be noticed in the neighbourhood of the kraals, perched in the forked branches of a tree.

The luxuries, indulged in by the Mashonas, appear to be confined to tobacco, not usually smoked, but taken as snuff, and beer manufactured from the seed of the millet. Drunkenness is an uncommon vice, except amongst certain of the chiefs. In the coast districts hemp is smoked in a hookah pipe of simple construction. A long narrow gourd forms the body of the pipe. Halfway down it a hole is made of a convenient size for applying the lips. The gourd is filled with water halfway to the level of the hole. Through the closed top is inserted a small hollow reed, reaching nearly to the bottom of the water, and protruding well beyond the upper end of the gourd. To the upper end of the reed is fixed the clay or stone bowl of the pipe, and this is of very small size, capable of holding only a sufficient quantity of hemp for a few whiffs. The smoker, holding the gourd upright to prevent the escape of the water, applies his lips to the hole, and draws the smoke to his lungs, through the water, by two or three vigorous inhalations. The result is made known to the whole neighbourhood by a violent, and apparently purposely exaggerated, coughing and spluttering; the louder the cough the keener appears to be the enjoyment of the smoker and his companions. The pipe is passed round, until the whole of the smokers are engaged in violent contortions, accompanied by an almost terrifying coughing.

The young men and boys, attached to the party as survey hands, displayed uncommon quickness and intelligence, and very soon became amenable to discipline. They appeared to take an interest in doing their work well, and were broken in to their somewhat difficult duties more easily than many labourers who have been trained to similar work in England. It was found that the Mashonas are willing enough to work if treated well; they are, however, stubborn and of an intensely suspicious nature. Their confidence in the promises of the white man has unfortunately received many shocks, and it is not to be wondered at that their trust is shaken. The men are averse to heavy manual labour, and it is characteristic of them that they employ their women for this distasteful work. Gangs of the latter were frequently seen with their babies slung across their back, leaning painfully over their short double-handed hoes, engaged in tilling the ground.

Returning from Mashonaland in November, 1893, a stay of three weeks was made in Beira. During that time the following maximum and minimum shade temperatures were noted :—

November 5, 5.45 a.m.	... ...	72° Fahr., minimum.
„ 10.30 a.m.	... ...	95° Fahr., maximum.

These observations were taken in the coolest part of Beira, in a verandah exposed to the sea-breezes; in other parts of the town temperatures of over 100° were more than once registered.

The average reading of the barometer at sea-level during this period was 30 inches; the highest reading recorded in three weeks was 30·07 inches, the lowest 29·76 inches.

Shade temperatures were taken on the march from Chiruvu Hills to Chimoio, in June. The following extracts will serve to give a good idea of the temperature during that month.

Chiruvu Hills—

June 15, 6.15 a.m., sunrise	57° Fahr.,	minimum.
„ 16, 3.45 p.m.	78° „	maximum, in shade.
	94° „	„ in sun.

On March from Chiruvu to Chimoio—

June 22, 6.15 a.m., sunrise	44° Fahr.,	minimum.
„ 20, midday	80° „	maximum.
Average temperature in shade	69° „	

Chimoio—

June 23, 5.50 a.m.	42° Fahr.
„ 8.35 a.m.	58½° „
„ 10.15 a.m.	64° „
„ 12.30 p.m.	75° „
„ 5 p.m.	69½° „
„ 10 p.m.	55½° „

June is the coldest month in the year. On the return journey to the coast in November no reliable observations were taken; there is no doubt, however, that the temperature was from 15° to 20° higher than in June.

The writer is indebted to Messrs. Livesey, Son and Henderson, for permission to make use of the map and of the notes collected while in their service. His thanks are also due to Messrs. D. G. Davies, R. de Candolle, F. Creswell, and H. Parkes, for assistance, photographs, and sketches.

NOTES ON MR. SELOUS'S MAP OF MASHONALAND AND MANIKA.*

By E. G. RAVENSTEIN.

THE map is intended, firstly and chiefly, to illustrate the work done by Mr. Selous whilst in the service of the South Africa Company; and secondly, to embody, as far as possible, the knowledge which we possess of the entire region extending from Fort Salisbury to the northward as far as the Zambezi, and to the eastward as far as the Lower Pungwe. Unfortunately for the map compiler, events in Africa sometimes march so quickly that he is not able to keep abreast of them. And thus, since the completion of the present map, information has been received from M. Décle, Mr. Coryndon, and Mr. Swan † which could not be utilized;

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* Map, p. 96.

† Mr. Swan, by observations made recently, places Victoria in lat. 20° 3′ 40″ S., 30° 51′ E.

and the railway between the "75-mile peg" and Chimoio, although open for traffic, could not be inserted.

Mr. Selous's manuscript maps have been deposited in the map-room of the Royal Geographical Society. They are as follows:—

1. Compass survey, showing routes during a year's employment in the service of the B.S.A. Company, September 1, 1890, to September, 1891. Scale 1 : 255,000.

2. Sketch-map, showing route of Manika Mission from Fort Charter to Umtasa's, and from thence to camp near Mount Wedza; also routes taken by Mr. Selous from camp near Mount Wedza to Makoni's, Mangwendi's, Maranka's, and back to Makoni's. Scale 1 : 255,000.

3. Sketch of routes from Umtali to Mapanda (Pungwe) and back, 1891. Scale 1 : 255,000.

4. Sketch of Mashonaland, showing tribal boundaries. Scale 1 : 255,000.

5. Rough survey-map of the countries ruled over by the Makorikori chiefs, for which a mineral concession has been granted to the Selous Exploration Syndicate. Scale 1 : 210,000.

6. About thirty sheets of manuscript maps and rounds of angles, utilized in the compilation of Nos. 1 to 4.

Mr. Selous has determined neither latitudes nor longitudes, but his long-distance compass bearings have enabled him to lay down a network of triangles which connects Fort Salisbury with Masikesi. These triangles include Fort Charter, Sengedza, and Maranka's in the south, Mount Mtemwa in the north, and Mount Dombo in the east, and Mr. Coles, under whose direction this triangulation was laid down by Mr. Darbishire, informs me that the distance between Fort Salisbury and Masikesi, as resulting therefrom, only differs to the extent of about a mile from that obtained by careful astronomical observations made at the two terminal points.* The greater portion of Mr. Selous's compass bearings were taken during the rainy season, when the air is very clear, and landmarks can be seen at great distances.

Mr. Selous also determined numerous altitudes by aneroid, but of the results he says himself that "they are of little value." The same remark might be applied with more or less justice to all other determinations of altitude, as far as we are able to test them, and the figures inserted upon the map should be accepted merely as approximative.†

Mr. Selous's routes during 1890–91 are shown in red upon the map.

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* Fort Salisbury, 170° 49′ 30″ S., 31° 4′ E. (Surveyor-General Duncan, by telegraphic time-signals); Andrada, near Masikesi, 18° 53′ 33″ S., 32° 51′ 24″ E. (Captain S. C. N. Grant, by moon culminating stars).

† Assuming the barometrical observations made at Fort Salisbury by Major F. W. Forbes, February, 1891, to July, 1892, to have been corrected for instrumental errors, and to represent true means at 34° Fahr., the altitude of that place would be 4800 feet.

For his earlier routes, as far back as 1874, the map published in vol. i. of the *Geographical Journal* may be consulted.

Little need be said about the other materials made use of in the delineation of the plateau of Mashonaland. The edge of the plateau is shown, as a matter of course, in accordance with Major J. J. Leverson's "Map of the Anglo-Portuguese Boundary in East Africa," originally published by the Intelligence Division of the War Office, and reproduced, on a reduced scale, in the *Geographical Journal.*

The originals of the maps of Mr. R. M. W. Swan (who accompanied Mr. Bent), of Sir Hugh Willoughby, and the Rt. Rev. G. W. H. Knight-Bruce, now in the possession of the Royal Geographical Society, were consulted, as was also the work of earlier explorers, among whom Mr. Baines will ever occupy a most distinguished place. A "Plan of the Manika Gold Route from surveys made in 1892 by W. Wybergh, T. Bayne, and R. S. Fairbridge," and published by Juta of Cape Town, proved of some service. The route eastward from Victoria to the head-waters of the Lusitu is taken from Mr. Stanford's map, and that taken in 1893 by the Salisbury and Victoria Field Columns in their march from Fort Charter to Buluwayo is derived from a rough sketch by Sir John Willoughby, lent me by the Intelligence Division. All latitudes, obtained by astronomical observations, have been inserted.

The delineation of the Zambezi river still depends in a large measure upon the positions determined by Dr. Livingstone and Captains Capello and Ivens. The Admiralty Chart No. 1577 is based upon recent surveys only as respects the river below Sena. Nearly all above the town, as far as the Kabrabassa rapids, is taken from very unsatisfactory Portuguese maps, among which that by Affonso de Moraes Sarmento, based upon information collected in 1877–80, and a more recent "Sketch," published by the Commissão de Geographia in 1889, are the most important. These two maps abound in details, but are evidently not based upon actual "surveys," and it is frequently quite impossible to combine the information which they contain with information derived from other sources.

The region immediately to the south of the Zambezi, between Kachomba and Tete, and as far as the lower Mazoe, has been traversed by Livingstone, Capello and Ivens, A. M. Pacheco,* Paiva de Andrada, Selous, Montague Kerr, Sir John Willoughby, Carlos Wiese,† and more recently by M. Décle, but none of these explorers have allowed themselves sufficient time to produce a good map of their routes. Mr. Selous, with his usual modesty, refers to his map of this region as being "better than nothing." As a matter of fact, the maps of the other explorers mentioned are no better than his, and a regular survey of the whole of the Zambezi valley, including the region to the north and south of the Kabrabassa rapids, is much to be desired.

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* Pacheco, 'Uma viagem de Tete à Zumbo.' Moçambique, 1883: (no map).

† Wiese, "Expedição Portugueza a Mpezene, 1889" (*Boletim* of the Portuguese Geogr. Soc., 1891).

For the upper Zambezi, in addition to the materials already referred to, some information was taken from Dr. M. A. de Lacerda's rough but useful map of the "Prazos" of the district of Zumbo, published in 1890.

The south-eastern portion of the map is largely based upon Portuguese explorations, and among all the explorers whose names I have inserted Colonel Paiva de Andrada occupies the foremost place, not only because he has traversed the country in every direction, but also because he determined numerous positions by astronomical observations. Only fragmentary accounts of his travels have been published, but most of his routes, as also those of Captain Augusto de Castilho and Gorjão de Mouro, will be found upon the Portuguese maps.*

Much useful work has been done since the foundation of the Mozambique Company in 1891. I believe M. Pouhin was the first to reconnoitre the country with a view to the building of a railway; but his map, kindly lent me by the Beira Railway Company, is of very doubtful authority. By far the most important work on that part of Portuguese East Africa, published up till now, is Capt. J. Renato Baptista's Report on surveys made in 1891 between the Lower Pungwe and Busi and Masi Kesi, with the view of discovering a route suitable for a railway.† These surveys, unfortunately, were prematurely interrupted, and the line ultimately adopted by the engineers of the Beira Railway Company lies far to the north of the routes explored by Capt. Baptista.

The route from the Lower Pungwe to Masi Kesi is partly based upon a manuscript sketch by Major Leverson, and upon Mr. R. Fairbridge's map of the coast route to Mashonaland (Cape Town: Juta, 1893).

The total distance from Sarmento to Andrada (Masi Kesi) is 75 miles according to Major Leverson, 90 miles according to Captain Baptista, 77 miles according to Mr. Fairbridge, and 75 miles according to Mr. Selous, whilst I made it 82 miles. The discrepancy, however, is much greater, for between Sarmento and Chimoio there are 39 miles according to Mr. Fairbridge, but 58 according to Major Leverson. I have accepted 45 miles, or one mile in excess of the distance given by Mr. Selous. A systematic survey of the whole of this region is much to be desired. It would, of course, have to include the determination of a few fixed points, for which the existing lines of telegraph offer every facility, and an "expeditive" triangulation of the whole territory.

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* J. X. de Moraes Pinto, Carta do Districto de Manica, 1885, scale 1 : 803,000; A. A. de Oliveira, Carta do Districto de Manica, 1887, scale 1 : 2,000,000; and E. de Vasconcellas, Esboço das Bacias dos Rios Pungue, Revue e parte do Busio, 1891, scale 1 : 500,000. For an account of Mouro's punitive expedition, see *Boletim* Lisbon Geogr. Soc., viii., 1888–9.

† 'Africa Oriental. Caminho de Ferro da Beira a Manica.' Lisbon, 1892. With map on a scale of 1 : 500,000.

THE GERMAN EXPEDITION TO ADAMAWA.*

By Dr. PASSARGE.

THANKS to the assistance afforded to the undertaking by the Royal Niger Company, the expedition reached Yola with seventy porters on August 31, 1893, having left Berlin in June. From Garua, a town with a promising future, which formed the base of operations of the expedition, an advance was first made by way of Laddo to Bubanjidda. This land, originally a vassal state of Yola, has ever since Barth's time asserted its independence, and, secure in its position on the group of mountains rising centrally from a broad plain, a warlike robber-state has arisen here, which lives at enmity with all its neighbours, and each year increases its territory by war. Though at first received in a friendly way, the expedition was treacherously attacked at Jirum, two hours' march from the capital, Rei Buba. The unmanageable nature of the caravan of donkeys, with which the expedition was equipped in order to save porters, prevented advantage being taken of the complete victory which was gained. A return was made to Garua, and it was determined now to press forward to Bagirmi by way of Marua. For several days the march led through an undulating gneiss region, above which massive granite ridges, all running from east to west, rose to a height of 2600 feet. In association with them numerous bands of porphyry are noteworthy, all with a dip of 35°. With the eastern slope of the Mandara range, and the broad plain which stretches away beyond the Shari, the region of independent heathen races is reached, by which the sultanate of Marua is separated from the rest of Adamawa, and which harass the caravan-road with their robberies. The caravans are accustomed to cross the district, which is two days' march broad, by night only. The pagans belong to the stocks of the Mattafall, Usuel, and Musugoi, and are related to the Musgu, having the same small ponies of the pagan breed, and the same throwing-knives, but with them the bow and arrows of the Fulla. The only covering of the men is a sheath woven of grass, while the women content themselves with a narrow lappet passed between the legs.

On December 23 the expedition reached the broad and fertile plain of Marua, and passed, one after another, the large towns of Songoia, Kattual, and Miskin. It is rather an under- than an over-estimate to say that on this one day two or three hundred thousand natives were passed. The Arab invasion of Bagirmi here put an end to all attempts at further progress. The expedition again turned towards the south in order to reach Ngaumdere (this, and not Ngaundere, is the spelling of the Fulla). The beautiful mountainous districts of Adamawa that were passed through are inhabited by isolated pagan tribes, mostly in only nominal dependence on the Fulla, and their representatives came to the forest encampments of the caravan to exchange their yams and millet for beads and salt. They belong to the race of the Durru, which formerly peopled the land much more thickly. Countless traces of former settlements are met with, existing in an almost imperishable form by the hollowed stones on which the women of the village once pounded the corn into meal, and which last for centuries. The escarpment of the South African plateau stretches like a wall from east to west, and when the traveller has mounted its height of 1600 feet, he finds himself on a broad grassy upland, on which the town of Ngaumdere, containing about thirty thousand inhabitants, lies at the foot of some granite ranges. The town is strongly fortified with wall and trench; it is the richest sultanate of Adamawa, and has spread its conquests over the pagan lands, principally to the south. On the return journey to Ibi, the expedition first followed the old route of Flegel as far as the Faro, and then proceeded by new routes over the Chebchi range, which has a height of 6500 feet, and stretches like a long wall in the direction of the volcanic line through Fernando Po and the Cameroons, and of which the Mandara range is the northern continuation. It is inhabited by the independent Dekkawa, who are perhaps allied to the Battawa. Crossing the fertile plain of Muri, the expedition reached Bantaji and Ibi, and arrived at Akassa on March 20.

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* Paper read at the Berlin Geographical Society, July 7, 1894.

Adamawa is in its essential features a mountainous land, traversed by the depression of the Benue valley running from east to west. In consequence of the occurrence of two distinct tectonic directions, the mountain structure is very complicated, and there is frequent alternation of mountain groups and plains. It must be said, in general, that the development of large states has been hindered by the broken nature of the land. The vegetation consists for the most part of mixed bush-forest, *i.e.* of moderate-sized trees and shrubs, now close together and now far apart, between which grass grows, often without underwood. The mountain woods of Combretaceæ, which are clothed in January with fresh bright-green foliage, with a gloss like that of varnish, are especially noticeable. True savannahs and park-like landscapes are only met with locally, primeval forests are altogether wanting, while extensive grassy plains cover the upland region near Ngaumdere. Animal life nowhere forces itself into notice. Antelopes (springbok and hartebeests) are never quite absent, it is true, but are met with singly as a rule. The extensive wildernesses on the Faro above Chamba are especially rich in large animals, elephants, rhinoceros, and buffaloes occurring in large numbers, together with large Carnivoræ.

The inhabitants of Adamawa are very varied. Two large groups, differing in religion and nationality, can be distinguished. The Mohammedans are composed of Fulla, Haussa, Kanuri, and Arabs, among which the Fulla are the most powerful race. Their tall slim stature, fine Caucasian features, wavy hair, and clear yellowish-red colour, distinguish them sharply from the negroes. The various grades of admixture between the two can often be studied. The clear colour is the first to disappear, next the face and figure become plump and fleshy, while the shape of the skull and the relatively long and narrow face are retained the longest. While there are few pure Fulla in the Haussa lands, they are here very frequently seen, especially in the small states of Central Adamawa. The nomadic Fulla—Borroro—who have retained the mode of life of their ancestors, move with their herds of cattle from one district to another. One but seldom gets a sight of the men—lusty individuals adorned with brass rings and feathers, and clothed in skins—whereas the women, who are at once recognized by the brass rings in their ears, and their coiffure consisting of numerous plaits, come frequently into the towns to sell milk and butter. The stationary Fulla have, as a rule, adopted the dwellings and manner of life of the subject races, and have the same round clay huts with pointed grass roofs, the same mat fences cutting off the separate houses, as are in use in the Haussa lands.

The Arabs, who live in isolated settlements, as, *e.g.*, at Yola and Garua, do not in the remotest degree play the part which they do in Wadai and Bornu.

Whilst the Mohammedans occupy the rich plains, large towns, and trade routes of the country, the pagans principally inhabit the mountainous tracts. They are divided into single large tribes, as the Batta, Dekka, Durru, Falli, Mundáng, and Baía, which speak different languages. The important states of Lére, Lame, and Lakka, have since Barth's time hindered all advance of the Fulla. As a rule, however, each town forms a state in itself, and constant feuds separate the tribes. The physical type is mostly robust but ugly, with the characteristic round, broad, and plump negro countenance. The original dress of the men must have been bark-cloths, or the simple sheath above mentioned, while many tribes may have gone quite naked. But in their intercourse with the Fulla, they have now for the most part adopted their clothing, and each wears at least a fragment of cloth. The women, on the other hand, have been more conservative, and still wear only a string of beads round the hips, to which a bunch of leaves is fastened before and behind.

The pagans are very skilled smiths, and supply the greater part of the weapons for the whole of Adamawa and the central Sudan. They also supply much of the salt from the ashes of plants, which is a bluish-grey powder, and tastes strongly of potash salts.

The political relations of Adamawa can only be elucidated by the history of the land, of which we know but few positive facts. The Fulla appear to have intruded as cattle-rearers into pagan Adamawa as far back as the fifteenth century, and to have occupied the upland plains between Bango, Tibati, and Ngaumdere. When, at the beginning of this century, the movement of the Fulla in this direction from Gando and Sokoto, based on political and religious grounds, began, the victorious Fulla forced their way into Adamawa, which was already strewn with numerous Fulla colonies. The history of the Fulla states of Adamawa thus differs from that of those of all other parts, since they were built up, not on the foundation of previous civilized communities, as those of the Haussas, Nupe, or Sonrhai, but on the ruins of uncivilized heathen races. The indigenous races were conquered—the Batta in the Benue valley between Yola and Garua first of all—and this fertile valley became the cradle of the Fulla states of Adamawa; the victorious Fulla pushed constantly forwards, and with the help of the Borroro, already on the spot, the foundation of the important states of Buban Jidda, Ngaumdere, Tibati, and Banyo, all placed in lands suitable for cattle-rearing, was successfully carried out.

The organization of the new states proceeded thus. The Emir of Yola, the first Fulla state of Adamawa, which had itself been formed under the banner of Sokoto, gave the newly conquered land to the leader of the army, the latter having to pay a definite yearly tribute and to supply a contingent to the army, while his successors had to recognize the suzerainty of the Emir of Yola. The new king on his part divided the land into smaller portions on the same terms on which he himself had been set up. The Fulla have thus formed a feudal state, as fully developed as any that existed in Europe in the middle ages, and the development has run the same course here as there, and has led to a complete decentralization. The vassals are sometimes more powerful than the liege lord, and are now only nominally dependent.

The Fullas became in part settled on the land, and cultivated the fields with the help of the captured slaves. The rich land became a favourable field for the activity of enterprising Haussas and Kanuris, who settled down as merchants, weavers, potters, dyers, etc., and exchanged their products chiefly for slaves and ivory. The pagans were more and more pressed, and became subject voluntarily and paid tribute, or retired leaving unpeopled wildernesses behind them. In the central Fulla states a balance of power was soon established; the slave-raids ceased, or brought in but little proceeds. The chief source of the wealth of the Fulla was exhausted, the cattle-plague of recent years has destroyed the stock of cattle, and the Fulla is impoverished and burdened with debt, while the active Haussa and Kanuri have become rich. Even the Fulla chieftains are already in a state of pecuniary dependence, and have usually their Haussa bankers, to whom they are deeply in debt. It has been otherwise with the development of the exterior states, such as Tibati, Ngaumdere, and Buban Jidda. With boundless pagan lands before them, they have constantly extended their supremacy, and slave-raids have become for them an inexhaustible source of wealth. True though it is that whole tribes have been annihilated, whole lands devastated by the spread of the Mohammedans, one good has resulted from this advance of the Fulla, namely, the opening of these regions to trade. The Haussa trader fetches ivory from Ngila on the Sannaga, from the Shari, the Sanga, and Logone, in order to bring it to Yola and the markets of the Sudan.

A new element, which will constantly become of more decided importance, both for the political and economic relations of the central Sudan, and which has already brought about great changes, is the European trade on the Niger and Benue. Down to a recent date, the Sudan had intercourse with the Mediterranean lands and Europe across the Sahara. Ivory, ostrich-feathers, and slaves were exported in exchange for European wares. One of the most important articles of trade was salt, brought from the desert by Tuaregs and Arabs. Since the impulse given to European trade on the Benue, the Sudan has been flooded with European stuffs, salt, etc., in such quantities, and at such a cheap rate, that the trade across the desert has been completely ruined. Adamawa was, and is still, the main region of export for ivory and slaves. All the trade now goes to Yola in the hulks of the Royal Niger Company. Ivory, caoutchouc, indigo, ground-nuts, and sesamum are the articles of export dealt in there. It is to be foreseen that a war of extermination must break out between the Fulla and European civilization; for the Fulla lives by slave-hunting—it is the source of his wealth. He is of necessity an opponent of European culture. The future of this land is in the hands of that energetic race of born traders, the Haussas, whose speech even now forms the most important organ of intercourse from the Senegal to the Shari.

MOUNT BROWN AND THE SOURCES OF THE ATHABASCA.*

By Professor A. P. COLEMAN, Ph.D., School of Practical Science, Toronto.

THOSE two giants, Mounts Brown and Hooker, which on the maps stand guard over the Committee's Punchbowl in the Athabasca pass, have long had a certain fascination for me. Geographers give them an altitude of nearly 16,000 feet,† much surpassing any other mountains in the United States or Canada; but there seems no record as to who determined the reputed heights, nor how the work was done. They were named after two distinguished English botanists by Douglas, who crossed the pass in 1826; but having been unable to obtain the copy of the Geographical Society's *Journal* in which the results of his travels are recorded, I cannot say whether he assigned the heights generally given.

To reach Mount Brown is not so easy as it looks upon the map. An attempt made by a friend and myself by canoe on the Columbia and its tributary Wood river failed through an upset in Surprise rapids. A second attempt made with ponies on the eastern flank of the Rockies in 1892 was likewise unsuccessful, partly from the uselessness of the Indian guides employed, and partly from the sickness of a member of the party.

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* Map, p. 96.

† Keith Johnston's 'Physical Atlas of Natural Phenomena,' p. 26, gives 15,900 feet for Mount Brown, and 15,700 for Mount Hooker. Reclus, in his 'Nouvelle Géographie Universelle,' p. 261, gives the latter mountain a height of 16,980 feet.

A third expedition, consisting of Mr. Stewart, Mr. L. Q. Coleman, and the writer, with Frank Sibbald as cook and packer, succeeded in reaching and climbing Mount Brown last summer (1893); and it is proposed to give a brief account in this paper of the work done, and the country traversed.

We left Morley, a point on the Canadian Pacific Railway just east of the Rockies, on the 8th of July, and for three days urged our ponies north-westward through the foothills parallel to the Palliser range, a few miles to the south-west. The valleys traversed have the usual muskeg bottoms and grassy sides, dotted with small bushes of willow and knotched-leaved birch; while the hills, 500 to 1000 feet high, are fringed on top and on the moister northern side with poplars and Douglas spruce.

The trail then turned through a "gap" with bare cliffs facing eastward, and followed the Red Deer river, a tributary of the Saskatchewan, into the mountains, traversing a valley, partly wooded and partly prairie, giving charming scenes of river, meadow, and grove backed by moderately lofty mountains. The altitude of Morley is about 4000 feet, and our first camp in the Rockies, at the Mountain Park, was a little below 5000.

The route turns aside from the Red Deer about 10 miles from the gap, across a pass at 6500 feet, and descends to the well-named Clearwater river not far from its exit from the mountains. A mountain near the summit of the pass rises to 8500 feet, and is perhaps a few hundred feet lower than the average of the region.

The Clearwater owes its character to its passage through two pretty lakes not far from its source. These lakes are about 6000 feet above the sea.

After following the Clearwater some miles to the westward, the trail turns north-west once more, passing through narrow valleys and over a pass rising slightly above tree-line (7300 feet). The head waters of Atikosipi are crossed, another pass traversed, and White Rabbit creek is followed down to its junction with the Saskatchewan on the Kootenay plains. These plains, 4600 feet above the ocean, are really an inlet of the prairie* 7 miles long and 2 or 3 wide, having the same sward of green or sere grasses and vetches, or of sage and wormwood in drier parts.

Sunflowers and flax were in full bloom on the 17th of July, and great tufts of harebells made tempting mouthfuls for the ponies as they jogged over the elastic turf, happy to be on level ground once more.

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* See Dr. Hector's report in 'Captain Palliser's Expedition,' p. 111, etc.

The scenery is admirable, combining the beauty of the prairie with grand mountain forms, the more distant ones white with snow and glaciers. One splendid peak, projecting into the plains on the north of the river, is formed of a great anticlinal fold, an unusual structure in the eastern Rockies, where the prevailing type is of tilted blocks. As this mountain commands views up or down five long valleys, we named it Sentinel mountain. Skulls of buffalo and their numerous trails and wallows, show that the Kootenay plains were once a favourite feeding-ground for these almost extinct animals. According to the Stony Indians, snow never lies here in winter, from the frequent Chinook winds.

The route we had followed thus far is the usual road of the Mountain Stonies toward their more northern hunting-grounds, and has often been traversed by white men. The trail here divides up, one branch turning up-river to Howse pass, by which the Columbia may be reached; * another down the Saskatchewan toward the plains and Edmonton. The river is already a powerful stream here at its exit from the mountains. In 1892 we found it just fordable for ponies at a point where gravel islands divide it into six channels. Last summer, however, all the rivers were high from the unusually heavy snows of the previous winter, and we found the Saskatchewan quite unfordable, as chief Jonas and other Indians had forewarned us. We went down-stream till the river flowed in a single channel, swam the horses over, and ferried our stuff with a canvas boat we had brought for such purposes.

From this point onwards to the Athabasca pass is practically virgin ground. Though a few prospectors have followed up some of the northern tributaries of the Saskatchewan, there is, so far as I am aware, no printed record of their journeys. The route followed by Earl Southesk † was probably farther to the east, since we could not fit his map and descriptions to the region through which we travelled. Palliser's map proved quite useless. In the previous summer our Indian guides had led us quite astray, taking us out into the foothills and through wretched muskeg trails to the Brazeau. Here we took matters into our own hands, and followed up this river into the mountains again. On our way home we followed a wild pass up Job's creek, and down Rock creek to the Kootenay plains. Last summer we took a more direct route which my brother had used the year before, following up the Hahasigi-wapta, or Cataract river, as the Stony name may be

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* See Mr. Sandford Fleming's 'Expeditions to the Pacific,' in the *Roy. Soc. Can. Journals*, 1889, Sec. II. p. 89, etc.; also Dr. Hector's report in Captain Palliser's 'Exploration in British America.'

† 'Saskatchewan and the Rocky Mountains.'

translated. This enters the Saskatchewan just at the foot of Sentinel mountains, and is there so deep and swift as to be fordable with difficulty. It takes its source 40 miles to the westward in a delightful lake of blue-green water, cold and trout-haunted, fed by a magnificent spring 40 feet wide. Pinto lake, as we named it, is 5850 feet above the sea. A single range of mountains separates the valley of the cataract from that of the Saskatchewan to the south.

Turning north-west from Pinto lake, we crossed a divide, which may be called Cataract pass, rising 7550 feet above the sea, and made our way down to the Brazeau, one of the largest tributaries of the Saskatchewan. The pass is not an easy one, since snow-slides have mowed down the forest for half a mile in width at one place, and the fallen trunks make a most disheartening obstacle for ponies to cross. At the summit we found so much snow on July 24, that a wide *détour* up the mountain side was necessary to gain safe footing for our horses. Several glaciers come down to the level of the pass, and one feeds an indigo-coloured pond amidst the snows of the summit. The peaks on each side are of a very bold and rugged character.

A sharp descent of 1200 feet leads to the head-waters of the Brazeau, whose valley is walled in by high mountains of the tilted block or inclined plane type, having steep escarpments toward the north-east, and a slope, following the dip of the strata, of 25° to 50° toward the south-west. A number of the peaks which we climbed rose above 9000 feet, and one at the head of the river reached 10,150. Few or no summits toward the east rise higher than this, but a number of those seen toward the west are much higher.

The previous summer we followed the north fork of the Brazeau up to a lake 5 miles long,* and then crossed by Poboktan pass † and creek to the Sun-wapta; but this year we took a more direct pass suggested by chief Jonas. The trail climbs quickly up through evergreen woods into a narrow desolate side valley, treeless for 7 or 8 miles, and clammy with half-melted snow from a storm the night before, when we crossed it. The descent towards the Sun-wapta leads over muskegs, past beaver ponds, and through horrible burnt woods where the soil has been consumed, leaving sharp stones that roll under the horses' feet on the steep side of the gorge. The pass, which we named for chief Jonas, reaches 7700 feet, and has a rapid descent to the Sun-wapta at 5000 feet. From a height of 10,000 feet on a mountain near by we looked down upon the valley, where the river spreads out into narrow interlacing channels like a skein of ravelled silk flung upon the ground—a common feature of glacial streams near their head-waters. They are perpetually clogging their channels with a burden of pebbles and rock flour, through which they must seek new outlets.

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* Unconnected with any river on those maps which show it at all.

† So named from the owls which we saw on the trees near by.

Across the valley from our mountain a huge dome-shaped mass of snow, rising much above our level and brooded over by heavy clouds, sent long glacier tongues down into the valley between black precipices. The higher points in the group evidently rose several thousand feet above the one on which we stood. We estimated the highest peaks at 13,000 feet, or perhaps a little more. Dr. Hector gives a similar estimate for the highest summits near Howse pass, 10 or 15 miles to the south-west. We may have been looking at opposite sides of the same mountains.

The Sun-wapta (Stony name) is a large and rapid river, fordable with difficulty at most points, a tributary of the Athabasca not shown on the maps. We followed it down-stream from the mouth of Jonas creek, passing a tremendous rock-slide, where a cubic mile of quartzite has slipped from a mountain on the right shore, damming the river so as to form rapids, and hurling blocks many cubic yards in bulk half a mile up the opposite slope. This event took place not very long ago, for the yellow scar on the mountain has not yet turned grey with lichen growth.

Five miles below Jonas creek we passed the mouth of Poboktan creek, and pushed our way over trails so encumbered with fallen timber as to require much chopping, till the mouth of the Sunwapta was reached. There is a fine waterfall at this point, and a still finer one a few miles farther down on the Athabasca. The united stream, 100 yards wide and quite unfordable, plunges 60 or 70 feet into a very narrow cañon, so narrow that some daring man has flung a few tree-trunks across as a bridge. It is on the whole the grandest falls we saw in the Rockies, though not more beautiful than some in the cañon of the Brazeau.

At last the trail suddenly became well blazed and beaten, unlike previous portions, which cannot have been travelled for several years. We came upon stretches of prairie delightful to behold after weeks of forest. One evening the half bark, half laugh of coyotes drifted up from a distance, delighting the heart of Sibbald, our packer, who is a true plainsman, and declared that it was a decent country where there were coyotes.

After long days of battle with burnt woods, whose charred trunks and branches smear and smudge hands and face and clothing, after night camps pitched between shadeless black trees on a soil of sand and ashes, there is an endless charm in camping on a meadow of soft green grass, beside a brook shaded by clumps of willow.

Following the trail through the woods, we missed the mouth of Whirlpool river, for which we were aiming, and, reaching the Miette a few miles farther down, took it for the river we were in search of. A day or two later, the difference in latitude, the wrong direction of the valley, and the finding of railway survey pegs convinced us that we had entered the Yellowhead pass (Tete Jaune), where a survey was made a number of years ago for a projected route of the Canadian Pacific Railway.

A trading post, Henry House, is placed opposite the mouth of the Miette on the maps; but, as we could find no trace of it, probably it has been destroyed and the site overgrown with bushes. The law of the map-maker is apparently that of the consistent Calvinist, "once in grace always in grace." Marks on the trail showed that a party having horses much larger than ours had gone over it a few days before we arrived.

Retracing our steps, we ferried once more across the Athabasca, and followed the impetuous, sea-green Whirlpool river to its source. Once a much-travelled thoroughfare of the Hudson Bay Company and railway explorers, the Athabasca pass has now fallen into disuse. Portions of the trail have been swept away by the river, and many other parts we found impassable without hard chopping.

The valley is interesting. At one point a glacier comparable to that of the Rhone sends its blue ice front almost to the level of the river at 4400 feet, and supplies a third of its water. Other large glaciers provide the rest of the flood farther up the valley, until at the watershed the Whirlpool dwindles into an insignificant rivulet rising in a pretty little tarn, the Committee's Punchbowl, which masquerades on many maps as a lake 8 or 10 miles long.* A rill trickles southward from the other end of the "bowl," which thus divides its snow-fed waters between the Arctic and Pacific oceans at points thousands of miles apart. Moberly gives the elevation of the Punchbowl as 6025 feet, but our observations made it only 5710 feet.

Mount Brown greatly disappointed us. The only summit corresponding to its position on the maps, just west or north-west of the Punchbowl, was climbed by Mr. Stewart and my brother, and turned out to be little, if any, more than 9000 feet high. They found no difficulty in the ascent, except a mile of steep snowfield, until just beneath the summit, where a cornice of snow proved unscaleable. Readings of an aneroid and of a boiling-point thermometer, when compared with readings at camp, give a height of 3340 feet above the pass, or 8950 feet above the sea; and they estimate the thickness of the snow cornice covering the crest at less than 100 feet. From the top no higher mountains were to be seen west of the pass, so that there is no doubt the right mountain was climbed. Mount Brown must descend, then, from the position long accorded to it, of being the highest summit in North America between Mexico and Alaska. It has no right to be mentioned in connection with Mount St. Elias in Alaska, nor Orizaba in Mexico, much less with the recently discovered Mount Logan, just east of the Alaskan frontier in the Canadian north-west territory.*

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* Alex. Ross in 'The Fur-Hunters of the Far West,' 1855, vol. ii. p. 188, etc., gives a correct account of the pass, which he crossed in winter.

The case of Mount Hooker we found less easy to settle. The point nearest its position, as given on the map, is only about 8000 feet high according to aneroid readings taken by Mr. Stewart and my brother; but a handsome glacier-covered mountain, just east of the Punchbowl, probably reaches 11,000 feet, and there are summits a few miles to the south-east that may reach 12,000 or 13,000 feet, though lack of time prevented their ascent.

The Punchbowl, reflecting gloomy mountain flanks and snowfields, suggested no ideas of conviviality. The little meadow beside it, surrounded by stunted spruce groves, was enlivened with some flowers. Marmots sounded their alarm whistle from behind every rock when any sound, like the chopping of wood, disturbed them. A cinnamon bear walked calmly down into the patch of meadow, surveyed us a moment, and turned courteously into the woods so as not to disturb our privacy. Caribou left their large hoof-prints on the river flats not far away, and mountain sheep and goats doubtless watched us from afar; but the general effect of the surroundings was lifeless and austere.

On our return journey we made a *détour* to visit Fortress lake, discovered the summer before, and named from a prominent mountain on its shores. We retraced our steps down the whirlpool, turned up the Athabasca, crossing the Sun-wapta near its mouth, and forded the eastern branch of the Athabasca where the river forks. We followed up the western smaller fork, and named it Chaba river, in honour of Job Beaver, an enterprising Stony whose lodge-poles we found in the valley. The name is doubly appropriate, since beavers, though now apparently extinct in the region, were once numerous, as shown by their extensive dams. There are so many Beaver creeks or rivers in north-western Canada that we chose the Stony word, Chaba or Chahba.

Fortress lake, which is 8 miles long by 1 or 2 wide, has waters of pale turquoise blue, fed by a few glacier torrents, and reflects the bare purplish cliffs, the flanks clothed with splendid unburnt evergreen forest, and the glacier-covered summits of some of the finest mountains to be found in the Rockies. The lake has a curious subterranean outlet into a tributary of the Chaba river, but sends most of its water into Wood river, an important affluent of the Columbia; so that, like the Committee's Punchbowl, it sends its waters to the Pacific as well as the Arctic oceans. The lake stands 4330 feet above the sea, and forms the summit of a pass 1400 feet lower than the Athabasca pass 10 or 12 miles to the west, 950 feet lower than the Kicking Horse pass followed by the Canadian Pacific Railway, and 610 feet higher than the Yellowhead pass.

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* In the *Am. Geol.*, Jan. 1894, Mount St. Elias is given a height of 18,015 feet, Orizaba that of 18,315·8 feet. In the number for April, 1894, Mount Logan is represented as 19,514 feet high, far surpassing any other point of North America.

The valley of Fortress lake, belonging as it does to the British Columbian side of the Rockies, shows a richer vegetation than other valleys we had visited. White and black spruce grow to an immense height. A trunk stranded on the shore was 60 feet long, nearly 2 feet thick at the smaller end, and had not yet branched. A few pines grow along the shore, and aspens, balsam poplars, and willows grow on the plain at the head of the lake. The giant cedar and the prickly "devil's club," characteristic growths of British Columbia, occur very sparingly. White winter-green and half a dozen other berry-bearing plants thrive in marshy places of the valley, while the rhododendron and the three Rocky Mountain heathers cover wide stretches of the mountain sides. Avalanche tracks, from which the big trees have been swept, grow up with gooseberries, currants, and raspberries, and make favourite haunts of the bears.

Our return route was practically the same as the one followed in coming out, though the Saskatchewan was now fordable, saving us a *détour* at the Kootenay plains. Apparently no Indians crossed the great river that summer, since we found no traces of them, and but one white man beside ourselves, a prospector named McGavan, whom we ferried over on our way out. The mountains through which we travelled may be said to have no human inhabitants, though a few families of Stonies hunt the sheep there now and then.

To sum up the topography of the Rockies between the Saskatchewan and the Athabasca in a few sentences, we may describe the eastern side of the Rockies as consisting of a series of more or less steeply tilted blocks facing north-east in precipitous escarpments, and having gentler slopes following the dip of the strata toward the Pacific. They rise to a height of 8000 or 9000 feet toward the east, and 2000 or 3000 feet higher toward the watershed. They are evidently the result of tremendous reversed faults, like those described by McConnell from Bow pass.* Somewhat rarely these faults are replaced by sharp folds, *e.g.* Sentinel mount in the Kootenay plains. Eighty parallel ridges result from these faults along the Brazeau, but the number varies in other parts. Running north-west and south-east between these parallel ranges we find a somewhat regular series of longitudinal valleys, generally occupied by creeks tributary to the main rivers, while the latter have cut for themselves larger, less regular, transverse valleys approximately at right angles to the others.

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* 'Geol. Sur. Cam.,' 1886, vol. ii. D.

At the watershed, on the other hand, we find groups of less regularly disposed mountains, sometimes consisting of nearly horizontal strata and of cathedral shape, rising in their highest summits perhaps above 13,000 feet. The rivers and lakes of this portion of the mountains have not the regularity of direction found in the eastern ranges.

The rocks of the region, so far as can be determined from fossils collected in 1892 and '93, are of Devonian age, and consist of limestones, shales, and slates, underlaid by thick beds of quartzitic sandstones and conglomerates. The time of elevation is post-Cretacious, since Laramic rocks occur in some of the valleys, as near Brazeau lake, and Cretaceous rocks may be observed tilted into foothills near the Brazeau gap.

Distances were determined by pedometer or dead reckoning, checked by frequent latitude observations; heights by means of three aneroids and a boiling-point apparatus, the height of the Athabasca at the mouth of the Miette, which was determined years ago in railway surveys, serving as a check. The readings were compared with sea-level barometer readings for the region, kindly supplied by Mr. Stupart, of the Meteorological Service of Canada. It is believed that the heights determined are not more than 100 or 200 feet astray.

The accompanying carefully executed map is the work of Mr. Stewart.

THE WESTLAND ALPS, NEW ZEALAND.

From November, 1893, till May, 1894, Messrs. C. E. Douglas and A. P. Harper, explorers in the service of the Department of Lands and Survey, New Zealand, were engaged in a reconnaissance survey of the Upper Waiho country, including the hitherto untouched Franz Josef glacier. Their reports and maps appear amongst the appendices to the Survey Report for the current year. Bad weather and the unfavourable condition of the ice rendered it impossible for the explorers to reach the upper *névé* and ice-fields, but a route to the glacier was "blazed," and the glacier itself examined as far as was practicable. The road-line, river, and terminal face were traversed with chain and compass, and the rest surveyed by a "compass ray-trace," heights being ascertained by the use of two aneroids, and positions checked by reference to known points of the Trigonometrical Survey. So far as the river is concerned, the Waiho seems to differ little from others in Westland. The scenery is, as elsewhere, magnificent; but there is the same story of the gradual extinction of the native birds. Kiwis and maori-hens grow fewer in number every year, and many of those left fail to mate during the breeding-season. Mr. Douglas attributes the scarcity to cats, run wild from deserted diggings, more than to dogs, Norwegian rats, or even stoats, who usually have to share the blame amongst themselves.

Variety as well as number is extremely limited: two grey ducks, a pair of blue ducks with five young ones, a solitary shag, and one old gull represented aquatic bird-life. In the bush were found kakas, pigeons, kiwis, hens, crows, storm-birds, and canaries; but, curiously enough, no tom-tits, only one robin, and very few mountain wrens. Numerous spiders were found on the ice, and in the pools, three miles up the glacier, a short but extremely active insect of a species unknown to the explorers. Off the ice, the insect world was represented only by mosquitoes.

The valley of the Waiho is no exception to the Westland rule as regards the absence of marketable timber. The useful forests are on the flats and broken morainic hills near the sea. In the ranges, and all along the face of the outer hills, totaras, pines, and cedars only occur here and there, and the whole mountain forest is kamahi bush, with a few ratas and inos, ribbon-wood in patches, and the usual underscrub of geige, supplejack, lawyers, and pepper-tree. The geige disappears at an elevation of about 500 feet; supplejack ranges from 800 to 1500 feet. At about 3000 feet the mountain scrub begins, composed of akeake, black scrub, grass-tree, and pepper-tree, besides various kinds of heath, amongst which Mr. Douglas specially mentions the pineapple-topped neinei, with its curious foliage and habit of growth, as a shrub worth introducing in England. On the spurs in the highest places reached were found lilies, anemones, edelweiss, violets, flowering heath, and other alpine plants. One specimen of edelweiss was found as low down as 800 feet; but it appeared to be dwarfed and stunted in growth.

The form and general position of the Franz Josef glacier are best seen from Fig. 3, a reproduction of one of Mr. Harper's photographs. The view is taken looking up the glacier from a point on its left bank, on the Moltke range, 4000 feet above sea-level; and the mountain scrub in the foreground, with a neinei tree to the left, are worth noticing. The Moltke range, with steep or precipitous cliffs extending down to the glacier, passes up into the Kaiser Fritz range behind it, from which two tributary glaciers, the Blumenthal and the Melchior, flow into the Franz Josef. Beyond the Melchior is the south side of the immense *névé*, which is much broken up, forming really a tributary glacier, and on that account named the Agassiz. The main ice-stream comes from the other side of the great basin, more to the left of the photograph. The basin is surrounded by lofty peaks; Bismarck's Peak between the Melchior and the Agassiz; a hitherto unnamed summit, now called Conway's Peak, at the other end of the range separating the Agassiz from the Fox glacier; Mount Spencer; Mount Jervois at the head of the Tusk, a ridge which separates the Agassiz from the principal stream coming from Graham's Saddle, and other saddles leading over to the Tasman, between Mount Jervois and Mount de la Bêche. On the right side of the stream (the left of the figure), the Franz Josef receives the Almer glacier from the Baird range; and, somewhat further down, the small Carrel glacier from the same source, the latter, however, apparently entering as a beck through a narrow gorge.

The Franz Josef glacier terminates at Sentinel Rock, in lat. 43° 25′ 30″ S., long. 170° 10′ 58″ E.; height above sea-level, 692 feet. The total area of the glacier is estimated at 8·4 square miles, and of the watershed at 27·4 square miles, of which 5·9 are forest, 0·8 grass, 2·8 barren river-bed and rock, and 17·9 snowfields and ice. The surface-length of the glacier is 8·7 miles, and its mean width 0·53 miles, the horizontal length 8·4 miles, and total fall 8928 feet. The mean direction of flow is N. 41° W.; ratio of trunk to *névé*, 1 to 5, and of moraine to clear ice, 1 to 52. As appears from Fig. 1, the bed of the glacier presents steep, rocky sides of very uniform outline, the only important irregularity being Cape Defiance, on the left side (visible in the photograph), which juts out into the stream and encloses one of the two moraines which cover any extent of surface. Cape Defiance is in many ways the centre of geographical interest. Immediately above it is the Unser Fritz waterfall, the great feature of the region, with its small glacier and enormous precipices on either side. This fall is described as magnificent, especially after rain; under ordinary circumstances, its great height (1209 feet) dwarfs the apparent volume of water. A short distance above Cape Defiance the most important geological features are also, in all probability, to be found. The explorers did not succeed in getting ashore much above this point; but the moraine above Cape Defiance contains a sprinkling of Torlesse slates, of which the medial moraine is exclusively composed, indicating the beginning of the transition from the schists, out of which the valley of the Waiho has been eroded. It

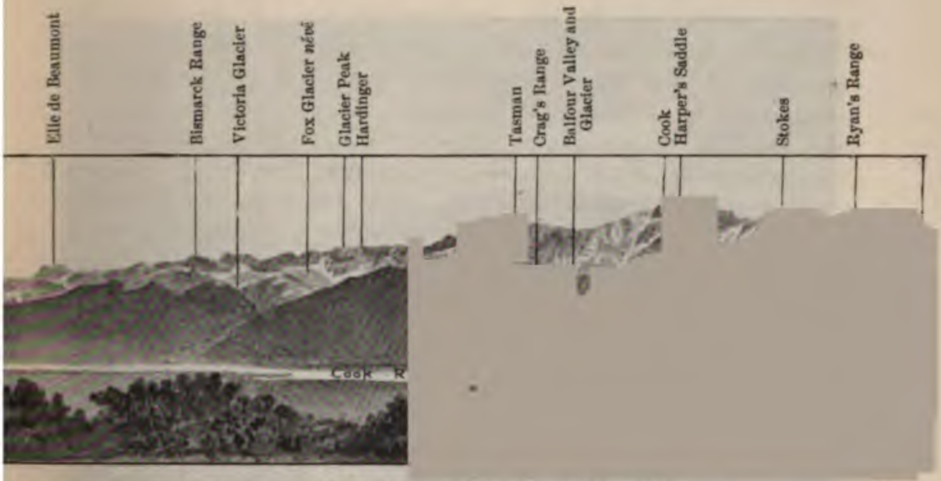

FIG. 1.—GENERAL VIEW OF THE WESTLAND ALPS.

may be mentioned that the dip and strike of the rocks are the same here as all over the country—north-north-east, with a dip east. Gneiss shows up at the Sentinel and Terminal rocks; elsewhere, only schist, and nowhere traces of dykes—only a few veins of quartz not worth noticing.

As might be expected, the exploration of a glacier which falls 8928 feet in 8½ miles was no easy matter. Such a descent would produce rough and rotten ice on a glacier having an elevation much greater than that of the Franz Josef, even with a less temperate climate at and a greater distance from the sea. It was evident from the first that it was hopeless to find a route straight up the glacier, for about a mile above the terminal face was a small ice-fall, consisting of ponderous broken ice, caused by huge longitudinal and latitudinal crevasses. An attempt along the south side failed, owing to the ice being lined by ice-worn precipices of 100 feet and more, fringed with scrub and bush growing on almost precipitous hill-sides, and the ice was very broken and unsafe for some distance from the sides. Only five times during the whole course of their work did the explorers find a practicable route through this rotten ice at the sides, and the nature of these may be gathered from the fact that in one of them it took an hour and three-quarters of hard ice-work to make good 300 yards. Finally, the north side of the glacier was attacked, and there the difficulties were found, at first at least, to be less formidable. Some distance up the glacier ice-worn

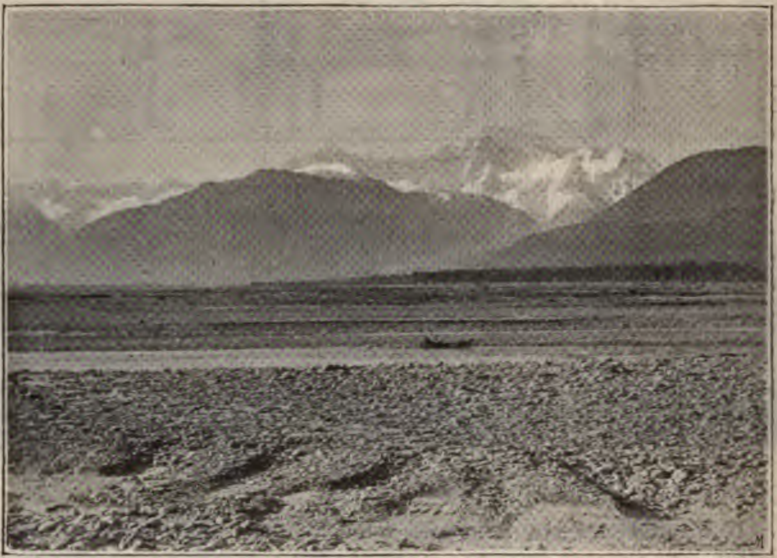

FIG. 2.—RANGES FROM COOK RIVER-BED.

cliffs about 100 feet high were again met with, and a number of small creeks, notably Arch creek, a deep gut between the bluff on one side and a conical rock—the "Eye-tooth"—on the other, in which a face of ice 200 feet high is exposed. Above Rope creek, a bluff of some 50 feet, the ice was skirted for about half a mile, and a route was found on to the glacier above the ice-fall—only, however, after six vain attempts. Thence a crossing was effected to a point above Cape Defiance, where the explorers encamped for some days. An attempt was then made to force the great ice-falls, which Mr. Harper describes as second only to the Haast, on the Tasman glacier. The ice was less broken on the north side, the crevasses and *seracs* being smaller near the influx of the Alma glacier, and it was hoped that two days' work would suffice to gain the head of the glacier. Unfortunately, a stretch of 200 yards on the lower *névé* was found altogether impracticable, and the party was forced to return, although all the remaining distance seemed comparatively easy. Mr. Harper is of opinion that experienced climbers would find little difficulty in reaching the upper *névé* during the winter season. The main range must always be difficult climbing, owing to the predominance of bad rock, but Mr. Harper believes that Mounts Spencer and Jervois, and the saddles between them, would be easier from the Franz Josef side than from the Tasman, once the *névé* were gained.

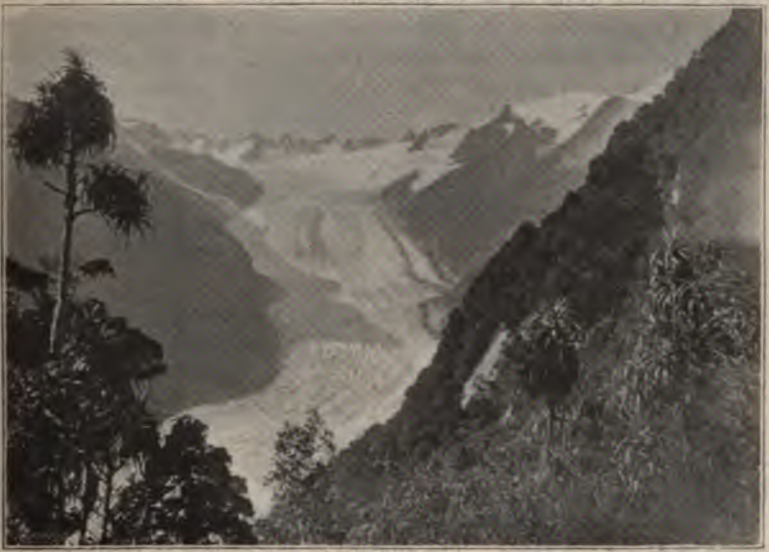

FIG. 3.—VIEW OVERLOOKING FRANZ JOSEF GLACIER FROM 4000 FEET.

The movements of the Franz Josef glacier are necessarily extremely active. Crackings are felt and heard frequently, and two or three days are sufficient to produce serious changes on the surface of the ice. The changes near the terminal face are immense, as is only natural so near the level of the sea. The level of the top of the ice at the face fell about 70 feet by simply melting between November 1 and the end of January, and the retreat during that time was in some places over 130 feet at the terminal face, while along the sides the rocks were in some places exposed as much as 50 feet. Until winter observations, which we understand have since been made by Mr. Harper, finally dispose of the matter, it is impossible to say whether the glacier is retreating or not. From sketches made twenty years ago from the flats, it would seem that there is a slight annual retreat; but most of the evidence tends to show a great winter advance quite equal to the summer retreat. Approximate observations of the motion of the glacier were made with the prismatic compass on two cross-lines, one above Cape Defiance, and another about halfway between it and the terminal face. The results are certainly astonishing.

Line I.	1.	(176 yards from side)	153·3	inches per day.
	2.	... ...	158·0	" "
	3.	... ...	200·0	" "
	4.	... ...	207·0	" "
	5.	... ...	—	
	6.	(132 yards from side)	71·0	" "
Line II.	1.	(15 yards from rock)	5·0	" "
	2.	... ...	30·0	" "
	3.	... ...	132·75	" "
	4.	... .	102·0	" "
	5.	... ...	53·0	" "
	6.	... ...	—	

Line I. is just below the great ice-fall and above a steep decline in the glacier; Line II. above a small ice-fall.

As already mentioned, there is very little moraine either on the surface or along the sides. The surface of the glacier is, contrary to the general New Zealand rule, practically clear of *débris*, with the exception of a narrow strip along the south side, coming from the rocks immediately below the influx of the Blumenthal glacier. This accumulates to some extent in the bend above Cape Defiance, and is continued to the only large piece of surface moraine, which is situated almost opposite Arch creek, and was probably caused by a slip which must have come down within the last two years. Mr. Douglas speaks with great emphasis of the importance of observing the future movements of this slip, which, according to the data given above, ought to reach the terminal face during the present spring, and to disfigure the snout of the glacier for some years to come with stones and dirty ice. Mr. Douglas believes that a large terminal moraine will be formed at the present terminal face, similar to one already existing somewhat lower down, or else a new lateral moraine, which may cause the old one to be attacked. In the latter case, data will probably be obtained by which to fix the age of a large moraine several miles further down the valley. In valleys containing large glaciers, four tiers of old ice-lines are always found; but in the Franz Josef no certain remains of No. 4 terrace have been identified, and Mr. Douglas concludes that, although at present the largest, it was during the great Ice period of only second or third rate importance, far eclipsed by Cook's glacier and the Karangarua. The moraines of the Franz Josef are composed of a larger proportion of Torlesse slates according as they come from points higher up the valley, and these points may have been determined by the possibility of slips occurring like that which came down two years ago. The older moraine probably came from between Unser Fritz waterfalls and the Blumenthal at the time the glacier was at the level of No. 2 terrace.

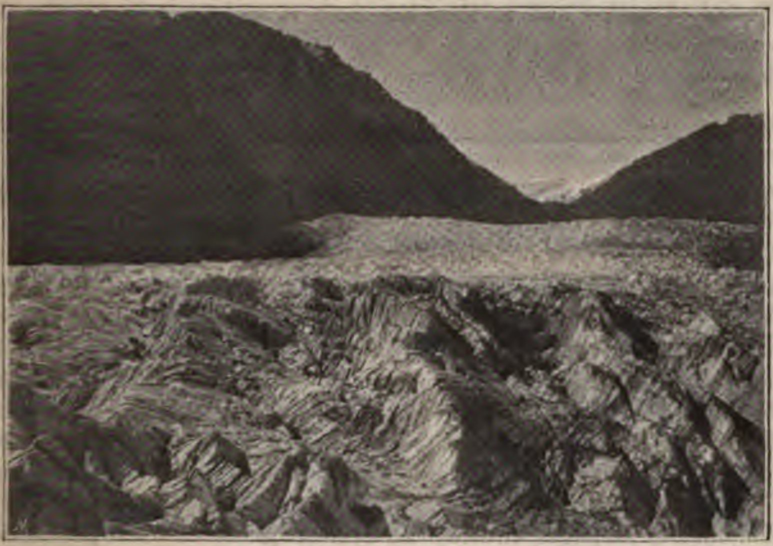

FIG. 4.—LOOKING UP FOX GLACIER.

After completing the Franz Joseph glacier, Messrs. Douglas and Harper explored the Balfour glacier, from which the middle branch of the Cook river flows; and partially mapped and explored the Fox glacier, the source of another branch of the same river. The main branch of the Cook, with the La Perouse glacier at its head, was also partly surveyed; but, owing to early snow coming on in April, the work had to be left incomplete.

The Fox glacier (Fig. 4), like the Franz Josef, descends to within 700 feet above the sea, and is 12 miles from the beach. Previous sketches taken from low-level stations were found to be incorrect, in so far as the Victoria glacier does not join the main ice-stream at all, but lies in a valley of its own. The general configuration is made clear by

Fig. 1. All the peaks and chief spurs of the main range have been fixed with reference to points of the Trigonometrical Survey, and the explorers are now completing the details of the general reconnaissance survey, on which Mr. Douglas has been engaged for several years.

The surface of the country as a whole is extremely broken, and up to a height of 3500 feet the ground is covered with almost impenetrable forest and scrub, necessitating the cutting of tracks up the river-gorges. The difficulties of the work are greatly increased by the excessive rainfall, which often cuts the explorers off from supplies. The bush, however, usually provides birds in sufficient numbers, and it is only necessary to carry oatmeal, tea, sugar, and such necessaries. In the absence of guides and porters, the camp is restricted to the lightest possible articles, usually only a "fly" to sleep under, which can be supplemented by a shelter of scrubs and ferns in bad weather.

THE GLACIAL LAND-FORMS OF THE MARGINS OF THE ALPS.

By HUGH ROBERT MILL, D.Sc., F.R.S.E.

At the close of the sixth meeting of the International Geological Congress, which was held at Zurich during August and September, an excursion occupying a week was arranged in order to afford an opportunity of examining the remains of ancient ice-action far beyond the reach of actual glaciers on both the southern and northern slopes of the Alps. This trip was planned and directed by Professors Penck and Brückner and Dr. Du Pasquier, who, from their previous knowledge of the localities to be visited, had drawn up a guide in the form of a pamphlet of 86 pages, entitled 'Le Système glaciaire des Alpes,' which is published in vol. 22 of the *Bulletin* of the Neuchâtel Society of Natural Sciences.

The special object was to exhibit the part played in the formation of the land surfaces at the base of the Alps by the moraines or glacial formations, strictly so called, of the great Ice Ages, and also of the intermediate fluvio-glacial deposits of moraine material which had been rearranged by water on the retreat of the ice. To these was added involuntarily, rather too much experience of the "pluvio-glacial" conditions which several days of steady rain at the beginning and at the end of the excursion induced on the steep surfaces of the clay slopes over which Professor Penck led his followers.

The main point of interest to the glacial geologist was the proof afforded by the sections of the occurrence of at least three successive periods of great glaciation, separated by relatively long intervals, during which the vast volumes of water liberated by the melting ice dispersed and rearranged the moraine material. To a geographer the interest centred rather in seeing how the scenery and structure of great stretches of country were determined by the heaping up upon the plains of extensive systems of low hills—low, that is, when compared with the Alps, for some of them exceed a thousand feet in height—differing entirely from the mountains of elevation lying beyond them. These hills and fluvio-glacial plateaus represent the amount of glacial erosion and transport; they are the rubbish heaps of the mountain sculpture. Their effect on the broad geographical features of the alpine border is very clear in determining the lines of communication. The amount of weathering they have undergone, according to the different ages of the deposits, decides the character of the soil, which in turn reacts on the vegetation and appeals directly to the eye, the general aspect of the landscapes of the first glaciation differing in a marked degree from those of the last. Unfortunately, the weather was throughout unsatisfactory for photography, and the attempts made to take comprehensive views were failures, as had been expected. Some fair results were, however, obtained in detailed sections, which are of geological rather than geographical interest.

The excursionists met at Lugano on Monday, September 17, when thirty-seven members assembled, including representatives of Austria-Hungary, Germany, France, Russia, Norway, Holland, Switzerland, Italy, the United States, England, and Scotland. The weather was hopelessly wet, the one interesting result of which was to throw into the shade the distinguishing peculiarities of the Italian lakes, and reveal the essential similarity of their scenery to that of the English lakes and Scottish lochs. Professor Penck explained, and in some cases subsequently demonstrated, that the lower ends of the North Italian lakes were dammed by glacial accumulations, thus raising their level far above the rim of the rock-basins which contain their deeper water, and accounting for such peculiarities as the "recurved hook" of Lugano.

A somewhat exciting boat-trip down the rapid Ticino landed the geologists at a fine section where the river had cut deeply through its moraine bar. Here, so far as sky or soil or vegetation were concerned, one might have been in Scotland instead of Italy. The steep boulder-clay slope, grown in part with the common coltsfoot, when ascended, led to a level moorland, the poor soil of which was covered with heather, not shrubby as in more northern latitudes, but composed of long separate flower-stems with exceptionally large heads of blossom. In the distance sombre pine woods crowned the hillocks, but at a turn of the path maize and sorghum were found as common field-crops, and the similarity to northern lands disappeared.

On Monday evening the party reached Ivrea by steam tramway from Santhia, and the whole of Tuesday was occupied in seeing, as well as the mist would allow, the vast glacial amphitheatre which surrounds the town, and in crossing the steep ridge of the Serra and the ferretto-covered slopes of moorland which succeed it to Biella, whence Milan was reached not long before midnight.

The morainic amphitheatre is both the largest and most typical of the southern slopes of the Alps. Two ramparts of moraine material diverge nearly at right angles from the mouth of the narrow valley of the Dora Baltea, gradually diminishing in height, and these are finally united by an arc of moraines convex to the south, so that the whole completely surrounds a central plain, the two little lakes occupying the centre of which overflow by the Doire, which cuts across the southern barrier. The eastern side of the amphitheatre includes the largest moraine hill of the system, so large that it by no means belies its name of the *Serra*. It is a ridge more than 12 miles long, and in its highest part more than 1300 feet above the bottom of the depression, towards which the sides slope at an angle of 20°. The accumulation is the result of several glaciations, the *moraine externe*, or early boulder-clay, being covered with a red weathered crust of *ferretto*, the intercalation of which between the older and newer moraines is one of the proofs of the occurrence of an interglacial period.

A railway journey next morning allowed a fine forenoon to be spent in driving from Lonato to Salo, on the Garda lake, through moraines and fluvio-glacial formations—some of them compact conglomerates. Here the successive glaciations were very clearly shown in several sections, the lower moraine of the earlier Ice Age having its pebbles much weathered; in some cases even the granites had crumbled into clay, retaining only their original form. Above this came a layer of conglomerate formed of ice-scratched pebbles stratified by running water, and on the top a fresher boulder-clay much less weathered than that below.

Coming up the Garda lake at night, the contrast between physical and political geography was finely shown by the uniform cliff walls and continuous water-surface broken by the long beam of the electric search-light at the Italian frontier station, which swept the lake all night for the prevention of smuggling.

On Thursday, September 20, the excursion left Riva by rail at 6.20, and had an excellent opportunity, on the journey to the Brenner line at Mori, of seeing that ice is not the only agent which is capable of producing scenery by the accumulation of detritus. The landslip-covered plateau of Loppo, with its lake formed in a hollow of the dolomitic detritus, and the still more extensive piles of landslip material about Mori, contrasted and compared in many ways with the glacial phenomena seen farther south. The Austrian Railway Company had provided, free of charge, an observation car at the end of the train, from which a good view was obtained of the deltaic wilderness through which the lateral tributaries entered the Adige, and of the extraordinary fertility of the alluvial flats, where maize and vines in alternate narrow strips covered almost all the available land. Later the porphyrite gorges marked the passage across the centre of the range, and beyond the Brenner saddle carriages were provided at Matrei to allow of a more detailed examination of the terraces of the Sill valley than would be possible from the train. The vastness of this accumulation of moraine, fluvio-glacial deposit, and moraine again, may be judged from the fact that it fills the ancient valley of the Sill, and that the modern river had to cut down through more than 300 feet of it before coming to the underlying rock, into which the river-bed has now worn its way to some depth. As the road winds along the face of the steep slope of the clay gorge, it affords a view of the railway on the opposite side far below, cut in the hard rocks close to the river, while the slope above is so unstable that it remains in many places bare of vegetation, and wattled fences have been run along in zigzags to bind the clay and reduce the risk of damage to the roadway by sudden falls. In the moraine material the action of sub-aerial denudation has produced a number of "fairy chimneys," the *Erdpyramiden*, or earth-pillars, with which the name of Tyrol is usually associated in elementary text-books of geology; but they are neither so large nor so picturesque as those of the Finsterbach, the view of which so well repays the labour of the arduous climb from Botzen to the Ritten plateau.

Two nights were spent at Innsbruck, and the whole of Friday the 21st was devoted to the study of the sections along the mountain slope of the left side of the Inn. Here the interglacial deposits were seen in their most impressive form. A steep climb along a clay slope of unquestionable moraine, crowded with highly polished and striated pebbles, showed an overhanging cornice of compact breccia resting on the moraine, and itself a hardened water-bedded deposit. Mayr's great quarry in this reddish breccia is a prominent object as seen from Innsbruck, and has supplied a great part of the stone which, from its hardness and durability, causes the newer streets of that town to recall the clear-cut buildings of Aberdeen. Above Mayr's quarry comes a nearly level plateau—the top of the terrace of accumulation—1000 feet above the flat floor of the valley, and similar in its features to the terrace of the Wippthal, through which the Sill cuts its way, as seen from Schönberg. As the quarry is carried further back the loose material above the hard breccia is cleared away in advance, and so a series of excellent sections of the upper moraine is exposed. The intercalation of this mass of breccia, several hundred feet thick, is a proof of the comparatively long duration of the interglacial period in which, according to Penck, it was formed as a talus or scree on the shores of the ancient Inn lake.

The remarkable terrace which breaks the steep slope of the mountains on both sides of the Inn valley is only found between the Oetzthal and the Zillerthal, from each of which glacial accumulations had blocked the main valley, thus giving origin to a lake which, invading the lower

Wippthal also, allowed the interglacial deposits to form on its margins, which are now represented by the top of the lateral terrace.

From Innsbruck the excursion proceeded by rail along the Inn valley into Bavaria, then by a branch line across the glacial amphitheatre of the Inn, and the monotonous plain south of Munich to Deisenhofen, whence the Isar was reached on foot. The contrast of the uniform levels and low moraine hills of this northern slope, with their ranges of rather dwarfish pines in monotonous plantations, was sharp when compared with the more abrupt slopes and richer vegetation of the southern side. The true plateau character of this country appeared when, after a walk of several miles along a straight and absolutely level road, a break in the line of trees in front showed the swift Isar flowing almost at our feet, and a steep path descending the gorge to its shore. Crossing the river we reached Höllriegelskreut, and saw a succession of sections demonstrating the triple glaciation and intermediate genial periods. Next day a trip was made from Munich to the Würmsee, or Lake of Starnberg; but the weather proved so unfavourable that, for the first time on the excursion, the full programme for the day as planned by the leaders could not be carried out. It was possible, however, to visit a remarkable surface of interglacial conglomerate at Berg, which has been enclosed and placed under cover by the German and Austrian Alpine Club, a body which has rendered inestimable services to the scientific visitor, as well as the tourist and climber, along the whole line of the Eastern Alps. This surface is so strongly glaciated that the rock is polished as if by a lapidary, and the internal structure of every constituent pebble is clearly seen. The characteristic striæ are there, showing how the glacier, long since shrunk back to the obscurity of the central Alpine ridge, had advanced over the hardened mass of cemented pebbles sorted out by water from an earlier moraine, and cut by its intense erosive power through pebbles and matrix alike. The Würmsee is deeper below the general level of the plain than the surrounding hills are high above the surface, and it is entirely surrounded by the interglacial deposits known as *Deckenschotter*, in which it seems probable that the whole basin was eroded beneath the pressure of the last great ice-sheet.

In concluding this short account of a delightful and memorable excursion, it may be of advantage to define the nomenclature and summarize the general theoretical conclusions arrived at by Drs. Penck, Brückner, and Du Pasquier.

Glacial deposits, so far as they occur in the Alps, are divided into two classes—the *glacial*, or moraines properly so called; and the *fluvio-glacial*, or alluvia formed by the action of running water on moraines. The latter are usually clearly stratified, but contain many pebbles marked by glacial striæ. Fluvio-glacial deposits are always being formed on the outer slopes of moraines, forming a gentle slope leading from the edge of the morainic amphitheatre to the plain of the enclosed depression. A complex of glacial and fluvio-glacial deposits of contemporaneous origin corresponds to each phase of the cessation of glaciation. Thus in a single glacial series there may be a succession of complexes, one partially superimposed on another, and each corresponding to a definite stage of retreat or advance of the ice. The fluvio-glacial deposits in a single glaciation are spoken of as inter-stadiary.

Under the deposits of relatively recent glacial accumulation which are characterized by trifling superficial alteration due to weathering, two other glacial series are found, distinguished from each other and from the most recent series by highly weathered layers or by evidence of great erosion, showing the existence of a long sub-aërial period between each epoch of glaciation. These periods are termed interglacial in distinction to the brief interstadiary periods which occur in the course of a single glaciation. Amongst the interglacial deposits of the neighbourhood of the Alps, at least on the north of the chain, *loess* must be included. *Lehm* is a product of alteration of loess, mainly distinguished by the absence of carbonate of lime.

The more ancient moraines are often weathered externally into a brick-red crust, termed *ferretto* by the Italian geologists. The moraines so coated always occupy the outer side of morainic amphitheatres, and are therefore called *external moraines* in distinction to the more recent *internal moraines*, which form the inner slopes and in part rest upon the more ancient. This is not a mere case of superposition, but of actual enclosure, the external moraine extending around as well as partially under the internal. The alluvia of the most ancient glaciation are termed *plateau alluvia* (Deckenschotter), those of the intermediate glaciation *high-terrace alluvia* (Hochterrassenschotter), and those of the most recent stage *low-terrace alluvia* (Niederterrassenschotter).

I cannot conclude without an expression of gratitude to Professor Penck, for his great kindness and tireless patience in not only showing, but making sure that every member of the excursion saw and understood the various features which he explained.

SURVEY OF THE MACCLESFIELD BANK, SOUTH CHINA SEAS.

THE 'Report on the Results of Dredgings on the Macclesfield Bank,' by P. W. Bassett-Smith, surgeon R.N., which has recently been issued by the Hydrographic Department of the Admiralty, contains valuable material for discussion in connection with coral reefs. The Macclesfield Bank lies in the centre of the South China Sea, halfway between the northern part of the island of Luzon and the coast of Annam, and due south of Hong Kong. Earlier surveys showed that it rises rapidly out of deep water, has a length of about 80 miles, and a breadth of 30 miles, and that the general depth over the greater part of the area is about 40 fathoms, with indications of a shallow rim round the edge, characteristic of a submerged atoll. Frequent reports of shoal water made by ships crossing the bank showed the need for an accurate survey, and the results of a day's dredging by Mr. Bassett-Smith on board H.M.S. *Rambler* indicated the importance of a scientific investigation of the coral. On April 23, 1888, the *Rambler* anchored on the south-west side of the reef, in lat. 15° 28′ N., 113° 51′ E., depth 13 fathoms. Seven hauls of the dredge were made in depths varying from 20 to 44 fathoms, and upon these Mr. Bassett-Smith reports: "The result of the day's work impressed upon me that life on the Macclesfield Bank was very active, it being very far from the condition of a *drowned atoll*. . . The surface of the Macclesfield Bank appears to shelve slowly down to 50 fathoms; here the rapid drop occurs. . . . Living coral was brought up by the dredge every time, but these deep-water corals were quite different from those obtained on the Tizard Bank, except one madrepora in 26 fathoms. There were two chief kinds—one, a compound coral in the shape of thin cups; the other, a branching, *very porous* coral, with large black polyps in deep cups, both entirely unable to stand any great surf action. . . . The most active growth of living coral was found on the slope down to 27 fathoms upon the 'Dead Coral Rock,' and from this depth the proportion of dead coral rock progressively increased down to 44 fathoms."

H.M. surveying-vessel *Penguin* was accordingly despatched to examine the bank in April, 1892, and the western half of the reef was surveyed, immense numbers of zoological specimens being collected. Reef-building corals were absent in only seven hauls of the dredge (excluding those over 50 fathoms), and six of these were on the inner side of the shallow rim, where the bottom was sandy, only one being on rock and sand outside the rim. Thirty-eight genera of corals were obtained, and probably many ordinary varieties are present which could not be brought up with the means at hand. The temperature of the surface water ranged from 79° to 85° Fahr., and that at the bottom of the lagoon was 76·9° Fahr. The tow-net showed that minute organisms were abundant. The currents over the bank were strong, and the water exceptionally clear—all favourable conditions for active growth. Mr. Bassett-Smith's observations at depths greater than 20 fathoms are of special interest. We extract the following: "From the patches of 10 to 20 fathoms, where the most abundant and most massive branching forms of corals were obtained, one passed down slopes more or less gentle to an average depth of 40 fathoms; this was either covered with sand, where no corals grew, or only psammocera, anacropora, and leptoseris, all small; or a rough bottom composed of, *to a very large extent, a rotten calcareous rock, formed by algæ in situ* . . . ; below this the surface was covered with 'coral sands,' turning into muds the deeper one went. . . . The amount of solid rock formed by vegetable organisms on this reef is, I am sure, very large; and as it was most abundant between 20 and 50 fathoms, its building-up power in such reefs as this must be a very important factor."

The other half of the work of survey was completed by H.M. surveying-ship *Egeria* in April and May, 1893, and Mr. Bassett-Smith was transferred from the *Penguin* for the time. The results of the previous year's observations were fully confirmed, and many interesting details added. Characteristic sections of the slopes on different parts of the bank were made, two of which are reproduced in the report. On the north side the slope is gradual for at least 10 miles; on the eastern slope 300 fathoms is reached only 1 mile from the shore, and on the southern side at a similar distance, both these sides being practically precipitous. A very significant feature was the number of heads of actively growing coral rising up out of the deep water of the lagoon—often nearer to the surface than the rim—the lagoon itself being a sandy flat with an average depth of 45 fathoms, on which only a few simple corals were found.

The net result seems to be, as Mr. Bassett-Smith states, that there is no reason to doubt that the actual increase of solid calcareous rock from these marine organisms requires a much less narrow limit of depth than is usually assigned to them. Growing coral is found in depths of 30 to 40 fathoms, and along with it large quantities of rock formed by calcareous algæ *in situ*. The living algæ may also assist in protecting the rock underneath them from the solvent action of sea-water. It is noteworthy that very few algæ are found on the lagoon flat.

Taken along with the conclusion, based chiefly on the hydrographic observations, that there is no evidence of a vertical movement of the bank as a whole, Mr. Bassett-Smith's reports afford valuable help in accounting for the depths of such lagoons, and strong support to Murray's theory of the formation of atolls. We are glad to learn that the extensive zoological collections, by no means confined to corals, have been sent to the British Museum for exhaustive examination.

THE MONTHLY RECORD.

THE SOCIETY.

Reception by the President.—On the afternoon of December 12, the President and Mrs. Markham held a reception in the Society's rooms, Savile Row, the object being to give the Fellows an opportunity of inspecting the extensive alterations which have been made in the Society's premises. About 650 Fellows and their friends attended the reception, which was in all respects successful.

Antarctic Exploration.—At the meeting of the Society on December 10, 1894, the President, Mr. Clements Markham, made the following remarks: When, just a year ago, Dr. John Murray of the *Challenger* read us that inspiriting paper on the renewal of Antarctic research, we all looked upon it as the commencement from which our efforts would begin towards obtaining the dispatch of an Antarctic expedition. It was a very crowded meeting, and great interest was taken in the subject. I therefore feel it my duty now to inform you of what we have done since with that object in view. As soon as we had received the report of our own Antarctic Committee, we addressed ourselves to the Royal Society, and the Council of that illustrious body appointed a committee to report to them on the subject. That committee made its report last May; a most important report it was, for it not only showed the great value of the scientific results of such an expedition, but also pointed out the practical value of these researches, especially with regard to navigation. I am glad to say that the Council of the Royal Society fully concurred in the strong view which was taken by the members of their committee. Last Friday, I am also glad to say, the Council of that most influential body the British Association passed a resolution strongly in favour of the work we have taken in hand. We have therefore addressed the other scientific bodies of the empire, and the Agents-General of the Australasian Colonies, and when all our work in that direction is completed, a deputation will be formed to represent the matter to Her Majesty's Government. I think we have made as much progress as we can expect, and things look very hopeful; but we all ought to put our shoulders to the wheel, for it depends on the view taken by the British public and the press, what conclusion may be arrived at by our Government.

The Sixth International Geographical Congress.—The complete programme of the Congress is now ready, and will be shortly issued to the Fellows of the Society, with another appeal from the President, Mr. Markham, for further subscriptions. The expenses connected with the Congress will be very considerable, and, while the Council will be prepared to subscribe a moderate sum, it is hoped that the Fellows of the Society will supplement this liberally, so that the reception given to the many geographers from all parts of the world may be worthy of the capital of the empire and of the Royal Geographical Society. The Congress will meet on July 26, 1895, and continue till August 3. It is hoped that arrangements may be made to hold the meetings in the Imperial Institute. There will be an Exhibition in connection with the Congress, and this will be of a most comprehensive character. It will probably remain open until the middle of September. Certain important subjects have already been arranged for discussion, and the Organizing Committee are taking every care that the work of the Congress will be of wide and present interest.

Educational Lectures.—The attention of Fellows is drawn to the fact that Mr. H. J. Mackinder begins the second series of his lectures on the History of Geography and Geographical Discovery, at Gresham College, on Monday, January 21, at 6 p.m. The special subject of this series will be the Period of the Renaissance and Modern Times. Details of the programme were given in the *Journal* for September, 1894. To these lectures Fellows are admitted free.

EUROPE.

The Tarns of the English Lake District.—At a recent meeting of the Geological Society of London, Mr. J. E. Marr, F.R.S., contributed a paper on "The Tarns of Lakeland," in which he pointed out that the fact of the outflow from a tarn taking place over solid rock was no proof that the depression was a rock basin. The most striking example brought forward in support of this contention was the tarn known as Small Water, the outlet of which runs over rock, but instead of following the bottom of the valley leading to Haweswater, it flows at first along the side of the valley in a narrow hollow of considerably higher level. A similar instance of a mountain torrent flowing in a narrow bed parallel to and at a higher level than the bottom of the valley to which it ultimately descends, is presented by the stream which passes the Berliner Hütte in the Zemmgrund, Tyrol, opposite the end of the Horn glacier. In the case of Small Water, the original valley was blocked by moraine material, and the outlet of the tarn at a higher level had cut down to rock, which prevented it from working laterally along the barrier of detritus to the lowest point.

ASIA.

Mr. Littledale's Journey to Central Asia.—Mr. St. George Littledale and Mrs. Littledale left England on November 10 for a second journey across Central Asia. On this occasion they intend to cross Tibet from north to south, if possible by a new route. If Mr. Littledale is successful in carrying out his programme, the additions which he will be able to make to our knowledge of Central Asia will be extensive and striking. Mr. Littledale is well supplied with instruments of all kinds, and is well qualified to use them. Besides Mrs. Littledale, he is accompanied by his nephew. They expect to be away for at least eighteen months.

Dr. Radde's Journey in the Caucasus.—A preliminary account of Dr. Radde's journey in 1893, along the eastern shore of the Black Sea and across the Western Caucasus, forms a supplementary number of *Petermann's Mitteilungen*, recently issued. This journey formed part of the general plan for the personal investigation of the Caucasus region which Dr. Radde has been carrying out for so many years, the results of which he hopes eventually to publish in a comprehensive work dealing with the physical geography of the whole region. In the account now before us, particular attention is paid to the progress made within the region in question during the thirty years which have elapsed since the author first became acquainted with it, and information of much interest is given as to the present condition and prospects of trade, cultivation, etc. The botany of the district is also carefully dealt with in its general outline, the author having undertaken the description of the Caucasus from this point of view for Engler and Drude's 'Vegetation der Erde.' Details are given respecting the trade of Batum, and especially the export of petroleum, which has assumed such large proportions within the last few years. Other commodities are exported in much greater quantities from the neighbouring port of Poti, which competes with Batum as the other terminus of the railway. The former place, which has practically come into existence as a port within the last thirty years, exports principally maize, cotton, timber, and manganese ore. It is considered by some to be more likely to repay the expense of harbour works than its rival. Dr. Radde also discusses the question of the success or otherwise of the attempt made within the last few years to introduce the cultivation of tea into the district. The soil appears suitable, and the plants have thriven admirably, but it is too early to pronounce upon the quality of the tea. Even should it prove good, the absence of cheap labour will be a hindrance. Owing to its sheltered position, Suchum possesses great advantages for garden cultivation, and there is hardly a second place in the Russian Empire so favourably situated in this respect. The town suffered much from the Turks in 1877. Dr. Radde visited the recently founded monastery of New Athos, and was surprised at the amount of solid work already accomplished. He also passed by the various colonies—consisting of Greeks, Moldavians, Russians, and Germans—in the valley of the Msymta and elsewhere which, though not entirely successful, are deserving of praise considering the obstacles they have had to contend with, amid the wilderness of rank vegetation. The last important place reached on the coast was Novorossеisk, the development of which, since the opening of the railway made it the outlet for the rich Kuban district, has been enormous. Wheat forms by far the largest export. In his journey across the mountains, Dr. Radde ascertained the precise localities still frequented by the Aurochs, and these he lays down in a special map accompanying the brochure.

A Topographical Survey of Goa.—The Indian Survey Department have applied to the Portuguese Government for leave to survey topographically the whole of the territory of Goa during the ensuing cold season. It is anticipated that the survey will not occupy more than one season, and it will be on the scale of one inch to the mile. The *Bombay Gazette* states that there is no record that any such survey has ever been made by the Goa Government, but we may remark that a detailed map was prepared under the superintendence of Lieut. James Garling, of Madras, in 1814, and was printed on a reduced scale at the Government Photozincographic office at Poona in 1877. It is anticipated that the Portuguese authorities will be only too glad to assent to the proposed survey, as it will be of undoubted use to their subjects, the territory having undergone considerable changes during the last eighty years.

AFRICA.

Count von Götzen's Journey across Africa.—A telegram was received in Berlin early in December announcing the arrival of this traveller (see *Journal*, vol. iv. p. 273) at Matadi, on the Lower Congo, thus completing the journey across the continent from east to west. From Ruanda, where he was last heard of, his route led through the Great Forest and along the Lowa, an eastern tributary of the Congo above Stanley Falls. A letter, dated from Lake Kivu, June 18, 1894, which was published in the *Deutches Kolonialblatt* for November 1, gives particulars of his explorations in the country west of the Victoria Nyanza, in the neighbourhood of the Ufumbiro mountains and Lake Kivu. He gives the names of five successive peaks, of which the most easterly is called Ufumbiro, after the district in which it lies. The most westerly, named Kirunga cha gongo ("place of sacrifice"), which Count von Götzen found to be an active volcano, was ascended by him, a way being cut for three days through forest. His provisional calculations make its height 3420 m. (11,220 feet). The crater-walls (nearly 1000 feet high) slope at an angle of 50°, and enclose a space almost a mile in diameter, with two shafts in its level floor, from the northernmost of which issued steam, reflecting a reddish glare. In order to reach this mountain, the river Nyavarongo was twice crossed, and is said by the traveller to be the most important branch of the Kagera. Lake Kivu, which has figured on our maps since Speke's time, and which discharges the Ruzizi into Lake Tanganyika, stretches southwards from the foot of the volcano. It is not much smaller than Lake Albert Edward, its south and west shores being invisible from the north point even in clear weather. A heavy surf beats upon the lava blocks on its shores. Its western as well as eastern coast belongs to the king of Ruanda. In the eastern part of this country the traveller passed a second lake, named Mohazi, 35 to 50 miles long, but only 1½ to 3 broad. From the recent telegram, it appears that the Lake Ozo of Stanley (which Count von Götzen was at first inclined to identify with Kivu) proves to be a river, as has so often been the case with reported lakes in Africa. It is quite possible, however, that the "Lake of Quando" or "Lake Chowambé" of Livingstone, was really Lake Kivu, though the first name occurs elsewhere as a corruption of Uganda, not of Ruanda.

Consul C. S. Smith's Kilimanjaro Botanical Collection.—The collection of dried plants referred to by Mr. Smith in his account of the Proceedings of the British Commission on the Anglo-German boundary in East Equatorial Africa in 1892, which appears in the *Journal* for November, 1894, pp. 424–437, was duly presented to Kew; and, although not very extensive, comprising only about 100 species, has proved of considerable interest. These plants have been roughly classified, and the evident novelties described and some of them published; but, in the present state of tropical African botany, some time must elapse before all the species can be satisfactorily determined. Very few are weeds of wide distribution, and among those easily recognized of previously described plants are some of unusual interest. Such, for example, as *Vellozia Spekei*, previously only collected by Speke and Grant; and *Rumex madeirensis*, which, as the name indicates, is also a native of Madeira. Specially interesting among the undoubted novelties is a new species of Welwitsch's genus *Sesamothamnus* (*S. Smithiei*, Baker), a singular fleshy, shrubby genus of the Pedalineæ, hitherto only known from the western side of the continent in Angola. There is a figure of the original species in the *Transactions of the Linnæan Society*, xxvii. t. 18. *Polycline* is a remarkable new genus of Compositæ, belonging to the group *Anthemideæ*, and characterized by having the discoid flower-heads so much elongated as to be in reality an abbreviated spike, each flower being subtended and almost enfolded in a bract. It is named *P. psyllioides*, and is published in Hooker's *Icones Plantarum*, pl. 2293, where a second species (*P. gracilis*) is described. This was collected by Mr. Joseph Thomson in Masailand. An orchid with a very large flower may prove to be a new genus, but the material is insufficient for description. Mr. Smith also brought home a small collection of living plants, including species of *Crinum*, *Chlorophytum*, *Albuca*, and *Hæmanthus*, and a number of interesting orchids, some of which are probably new. The following have already flowered at Kew: *Acampe polyglossa*, *Angræcum bilobum*, var. *Kirkii*, *A. Kotschyi* and *Cyrtopera flexuosa*.

Consul C. S. Smith on Lake Chala.—In the statement with reference to Lake Chala in Mr. C. S. Smith's paper in the November number of the *Journal*, on "The Anglo-German Boundary in East Equatorial Africa," Mr. Smith desires to state that he had no intention of casting any doubt on the observations of Mrs. French Sheldon. Mrs. Sheldon writes that she made the road descending to the lake, and that the pontoon found by Mr. Smith was carried thither by her own porters. Mrs. Sheldon also maintains that her statements about the effervescence of the water and the drawing of her paddles away from the pontoon are quite accurate.

Herr Neumann in East Africa.—This German zoologist, who has been travelling in East Africa since the end of 1893, paying special regard to the fauna of the country, has already completed some extensive journeys on the shores of the Victoria Nyanza, which may be expected to add to our imperfect knowledge of the countries to the east of the lake (*Petermann's Mitteilungen*, November, 1894). The journey to the lake was made as far as Ngoroine (near its east coast) by a more northerly route than Dr. Baumann's—*viâ* Nguruman—visited by Dr. Fischer in 1883. North of Lake Mandara the traveller ascended the peak of Doenyo-Ngai, which, according to the accounts of the Masai, seems to have been in eruption during the present century. Herr Neumann, who has succeeded in defining in many places the line of partition between the east and west African faunas, intends to continue his investigations in Uganda and the neighbourhood of Mount Ruwenzori.

British East Africa—Road from Mombasa to Kibwesi.—Capt. Gibb and Lieut. Arthur, who have lately reached the coast from Uganda (*Gazette for Zanzibar, etc.*, November 7, 1894), speak highly of the results of Col. Colville's administration, both as regards Uganda and Unyoro, in the latter of which the natives were gaining confidence in British rule, and settling down to agriculture. An excellent and safe road now connects Kampala with Kibero, on Lake Albert. Nearer the coast, too, a marked improvement was to be noted, and Lieut. Arthur bestows great praise on the road constructed by Mr. George Wilson, for the late Sir William Mackinnon, from Mombasa to Kibwesi, a distance of about 180 miles, which, he says, "is so good that I would undertake to drive a coach and four along the whole length of it." The great difficulty in this route is the want of water across the Taru plain; but this, it is said, might be easily overcome by lining the natural tanks which exist at Ta with a coating of cement, and so stopping the present rapid percolation of the wate

The New Road in Zanzibar Island.—From the *Gazette for Zanzibar an East Africa* (November 14, 1894) we learn that satisfactory progress is being ma with the road under construction by Mr. J. T. Last from Dunga, in the centre Zanzibar Island, to Chuaka, on its east coast. Gangs of workers were bei employed at three different points, Dunga, N'dijani, and Ufufuma, and Mr. La himself was engaged in laying out the road in parts where this had not yet be done. At Ufufuma, where quarrying had been necessary, the men had succeede in a short space of time in breaking down and levelling the Gendeli reef, and, th being surmounted, would make rapid progress with the remaining distance towar Chuaka. Mr. Last speaks favourably of the climate of the centre of the islan and recommends Dunga Palace as a sanatorium for the townspeople of Zanzibar.

Indian and African in Nyasaland.—The advent of the Sikh soldiers in Nyasaland seems already to have exercised a striking influence on the nati inhabitants. According to the *British Central Africa Gazette* (September 2 1894), not only have the latter begun to adopt the Sikh style of dress (includi boots, turban, trousers, and coats), but a new language has actually come into u consisting of an extraordinary mixture of Hindustani, Swahili, Yao, and Chinyan which is nevertheless well understood by the people. It has naturally not y acquired an extensive vocabulary or definite rules of grammar.

Exploration on the Upper Congo and its Tributaries.—The portion the Upper Congo above Nyangwe as far as the confluence of the Lukuga, whi has hitherto been shown merely as a dotted line on our maps, has lately bee explored by Mr. Mohun, American Consul on the Congo, accompanied by D Hinde (*Mouvement Géographique*, 1894, No. 21). The lake placed here b Livingstone under the name Urenge or Ulenge, and retained on Cameron's map Lake Lanji, was found to be non-existent, nor did the traveller hear the nam anywhere in the district. For a great part of the distance (from the north) th stream is mostly narrow, and barred by rapids. At one point (named "Hell Gate by Mr. Mohun) the width is reduced to 200 yards, and at another still further, t only half this amount. Before the Lukuga, however, the stream expands, an exhibits the same series of lagoons and pools which is characteristic of its western branch higher up. The whole valley is said to be extremely fertile. The Lukuga was ascended for some distance, but at M'Buli was found to be so obstructed by vegetation as to be impassable. The current was here hardly perceptible, but traces of a considerable rise during the rainy season were observed. Mr. Mohun, who has also furnished maps of Lake Leopold II., the Lukenye, and other tributaries of the Congo, has lately returned from Africa. In No. 22 of the same journal extracts are given from the report of M. Le Marinel, dealing with the rapids of the Mobangi, which furnishes more precise details than were previously available as to the amount of obstruction to navigation caused by each series. Most of the lower rapids can be passed by steamers at one season or another, some being easier at high, others at low water; the fall of Mokwangu, however, 13 feet high, arrests progress at all seasons. For details as to the upper course of the river, we are indebted to the members of Van Kerckhoven's expedition. From the notes of one of these, the late M. Van de Vliet, a sketch map of this portion is given in the same number of the *Mouvement*.

Belgian Exploration between the Welle and Darfur.—An important exploration has been effected by M. de la Kéthulle, a Belgian officer who has just returned from Africa, after four years spent in the service of the Congo State (*Mouvement Géographique*, 1894, No. 25). He accompanied Van Kerckhoven's Welle expedition, but, being sent north into the Niam Niam countries, he entered into alliance with the powerful chief Rafay (formerly a subordinate of Lupton Bey, according to the *Mouvement*, though the officer of this name, whose report of a great lake south of the Welle aroused considerable interest some years ago, was said by Lupton to have been killed *), and ascended the Shinko to the north, subsequently pushing across the waterparting to the Ada, or upper course of the Bahr el Arab, in the southern borders of Darfur. Here he was in a country of which, but for the scanty accounts of Dr. Potagos (see *Proceedings*, 1880, p. 387), and information collected by Barth, Schweinfurth, and Nachtigal, we had previously known nothing. It is, he says, a fine country, and is well peopled. The waterparting, where he crossed it, was well marked by a line of hills. Near the source of the Ada was that of the Kotto, a northern tributary of the Welle, which proves of more importance than had been imagined.

The Course of the Omo.—According to the *Mouvement Géographique* (1894, No. 24), an expedition sent by King Menelik to the countries south-west of Kaffa reports that the Omo flows neither to the east nor to Lake Rudolf, but that below the point reached by the last explorers it makes a bend towards the Nile. It would in this case probably be the upper course of the Sobat, as had been previously held by M. M. d'Abbadie and Wauters.

AMERICA.

The Alaska Boundary.—The Canadian Alaska Boundary Survey is now complete, and the results may be briefly stated. The boundary-line in question depends upon the Convention of 1825, between Britain and Russia, and may be said to consist of two parts, the eastern which follows the 141st meridian, the southern which separates the "Coast strip" of Alaska from the inland region behind it belonging to Canada. The first part raises no question except that of the position of the 141st meridian; the second appears to leave room for discussion between the parties interested, as will appear on inspection of Articles III. and IV. of the original convention (in French), also on reference to some preliminary discussion which took place in Washington in 1888 (see U.S. Senate 50th Cong. 2nd

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* R.G.S. *Proceedings*, 1884, p. 250.

Sess. Ex. Doc. 146). The surveys now completed jointly have been for the purpose of laying down this geography of the "Coast strip," some 500 miles in length, with a maximum possible width of 30 geographical miles, in order that, if possible, an agreement as to the actual position of the line may be reached. Pending the discussion of the completed maps which should result from the surveys, no line is mutually accepted or can be laid down authoritatively. The surveys and explorations have, of course, resulted in adding much to our knowledge of the region.

Greater New York.—The problem of unification appears to be in course of settlement in New York, as we are informed that a new municipality to be known as "The City of New York," upon which the electors of the various suburban towns had to vote in November, will have one chief executive and two separate legislative boards. The executive is to be aided by commissions, presided over by a single head. The property of each of the present municipalities will become the property of the new city, all debts and obligations will be assumed by the city of New York, and a uniform tax-rate will be imposed. The population of the various cities, towns, and villages which are embraced within the boundaries of the proposed Greater New York, aggregates 2,965,792, of which New York contributes 1,801,739, and Brooklyn 957,958, and the total area will be 317·77 square miles.

POLAR REGIONS.

Proposed Belgian Antarctic Expedition.—We learn from the *Mouvement Géographique* (1894, No. 25) that the subject of the equipment of a Belgian expedition to the Antarctic is occupying the attention of a group of Belgian scientists and others. If the necessary funds are forthcoming, it is proposed that the expedition should start in September next, and should extend over a period of eighteen to twenty months. It would be fully equipped for scientific observation, and the route suggested is one to the east of Graham's Land, in the direction of the recent discoveries of the *Jason*. In case it should be deemed impracticable to winter in those parts, that season would be occupied with investigations of the less-known parts of the Indian Ocean.

MATHEMATICAL AND PHYSICAL GEOGRAPHY.

Fjords: a Contribution to the Morphology of Coast-lines.—In the *Zeitschrift* of the Berlin Geographical Society (vol. xxix. p. 189), Herr P. Dinse publishes the first part of a valuable memoir on fjord-basins, in which he considers the structural character of this variety of coast. The most important part of the paper is a statistical supplement, in which he tabulates the numerical constants of no less than 83 different fjords, giving for each the position, length, depth, number of separate basins, with the slope of each from the head to the deepest part, and from the deepest part to the outlet, with several other particulars. The data were taken from the Admiralty and other charts of fjord-riven coasts in all parts of the world where these occur, and are discussed with the view of formulating a theory of fjord origin, which is promised in a later paper. After fully considering the varieties of type to be met with, Herr Dinse thus describes the essential features. Fjords are long narrow bays or sea-inlets penetrating an elevated or mountainous coast; their sides slope steeply both above and below water, giving a trough-like cross-section, while the longitudinal section shows an irregular relief of gentle ridges and shallow troughs. In all true fjords the depth inside is greater than that of the stretch of sea immediately beyond the mouth. There are several variants of this type. Thus two fjords entering the coast at an angle may meet, forming a sound separating an island. Again, the bar at the mouth may be slightly elevated so as to become dry land, and a fjord-lake or loch results. Minor subdivisions include the fjärd and schären types of the Gulf of Bothnia, differing only in the relative frequency of islands and continuous coast, and the föhrden type of the low coasts of

Denmark. These are entirely different from the inlets of the *ria* type, which occur on the coasts of Spain, south-western Ireland, and elsewhere. A *ria* is a more or less wedge-shaped inlet, gradually widening and uniformly deepening from its head to the sea, showing no trace of an included basin. It is noted, however, that prolonged sedimentation might ultimately convert a fjord into a ria. The distribution of fjords as distinguished from rias is subject to the general statement that there are no fjords except on the coasts of lands which show signs of recent glacial action. The coasts where they occur are those of Scandinavia, the west of Scotland, north-west of Ireland, Iceland, Greenland, Labrador, and the coast of Maine, the west coast of North America from Alaska to Vancouver Island, the west coast of South America from Chiloe to Cape Horn, Kerguelen, the Antarctic lands, and the southern part of the west coast of the South Island in New Zealand.

GENERAL.

Mr. R. Louis Stevenson on Maps.—The latent poetry and profound suggestiveness of a map has never been more gracefully exemplified than by the late Mr. Stevenson (whose premature death will be universally regretted) in a paper entitled, "My First Book," originally contributed to the *Idler*, and now published with others as a volume. His description of the origin of his own first novel is as follows: "On one of these occasions I made the map of an island; it was elaborately and (I thought) beautifully coloured. The shape of it took my fancy beyond expression; it contained harbours that pleased me like sonnets, and, with the unconsciousness of the predestined, I ticketed my performance *Treasure Island*. I am told there are people who do not care for maps, and find it hard to believe. The names, the shapes of the woodland, the courses of the roads and rivers, the prehistoric footsteps of man still distinctly traceable up hill and down dale, the mills and the ruins, the ponds and the ferries, perhaps the *Standing Stone* or the *Druidic Circle* on the heath; here is an inexhaustible fund of interest for any man with eyes to see, or twopence' worth of imagination to understand with! No child but must remember laying his head in the grass, staring into the infinitesimal forest, and seeing it grow populous with fairy armies. Somewhat in this way, as I paused upon my map of *Treasure Island*, the future characters of the book began to appear there visibly among imaginary woods; and their brown faces and bright weapons peeped out upon me from unexpected quarters, as they passed to and fro, fighting and hunting treasure, on these few square inches of a flat projection." This map, which inspired the book, was lost on its way to the publishers, and the frontispiece which appears in *Treasure Island* had to be drawn to suit the data of the narrative, but it was never the same to the author. The map was indeed the seed of the story, every detail of which sprang from the ideal topography. Mr. Stevenson points out the great value of maps to the novelist, and cites instances in which the best writers have stumbled from the want of such a definite aid to the imagination as a map, real or imaginary. "But it is my contention—my superstition, if you like—that who is faithful to his map and consults it, and draws from it his inspiration, daily and hourly, gains positive support, and not mere negative immunity from accident. The tale has a root there. It grows in that soil. It has a spine of its own behind the words." This is a special case, and a very interesting one, of the vast value of geography as an element of culture. And the inspiration to any author will be surprisingly increased by a full knowledge, not alone of the use of a map, but of the great principles of geography, which define the relation of the human race to their terrestrial dwelling-place. It may be found that geography, used as an instrument of intellectual training, will produce results unattainable by other means.

CORRESPONDENCE.

Expedition to Novaya Zemlya.

63, Jermyn Street, S.W.

WILL you permit me, through the medium of our *Journal*, to ask those Fellows of the Society (and I am sure there must be not a few) who have been yachting along or otherwise visiting the shores of Novaya Zemlya, if they would kindly give me any information in their power, especially about that part of the coast where the Matochkin Shar divides the two islands? I am intending, all being well, to take out at the end of the spring, as soon as the weather permits, a small expedition to explore the interior of Novaya Zemlya, with the view of obtaining as complete geographical, geological, botanical, and natural history results as possible. I have so far made my plans, and have secured the services of three very competent gentlemen: one is a retired officer in the Royal Navy, and a thoroughly capable nautical astronomer and geologist; an English doctor who will undertake the botany, a gentleman who is no novice in Arctic work, having acted as surgeon to the Peterhead whalers, and always kept the meteorological log for the Meteorological Society on these occasions; the third an artist, a known traveller and sportsman, and well up in all the shifts of camp-life. I personally shall undertake the zoology and general management.

JOSEPH RUSSELL JEAFFRESON.

MEETINGS OF THE ROYAL GEOGRAPHICAL SOCIETY, SESSION 1894–95.

Second Ordinary Meeting, November 26, 1894.—CLEMENTS R. MARKHAM, ESQ., C.B., F.R.S., President, in the Chair.

ELECTIONS.—*Captain Arthur* (*Rifle Brigade*); *John Warren Bakewell* (*Barrister-at-Law*); *C. H. Bellamy*; *Colonel G. H. Bolland* (*late R.E.*); *Geo. Wm. Brocklehurst*; *Charles de Bels Brounlie*; *Nathaniel Grach Burch*; *Samuel Butcher*; *John Thorrow Campbell*; *John Edmund Chandler*; *Capt. Chas. Fredk. Close, R.E.*; *Capt. Chas. Francis Cromie*; *Major-General Robert Henry Cunliffe* (*late Madras Corps*); *Capt. Hy. Rodolph Davies* (*Oxford Light Infantry*); *Count Gleichen* (*Grenadier Guards*); *Capt. Douglas Haig, 7th* (*Queen's Own*) *Hussars*; *Surgeon-Captain Seton G. Hamilton* (*1st Life Guards*); *David Theophilus Hanbury*; *F. Leverton Harris, M.A.*; *Commander Norwood Harrison, R.N.R.*; *McArthur Herbert*; *Alexander Hill*; *William Henry Himbury*; *Edwin Keyworth*; *Charles James Laffin, M.D.*; *George Lovett, B.A.*; *Wm. Lucas*; *Lieut.-Colonel F. Luttman-Johnson*; *Major Richard H. MacCarthy* (*The King's Own Regiment*); *Rev. Alexander Hugh Macdonald*; *Lieut.-Colonel W. T. McLeod*; *Thomas Murcott Martin, J.P.*; *William Miller, M.A.*; *Sir Lewis Molesworth*; *Lieut. George Molyneux-Montgomerie* (*Grenadier Guards*); *Wm. John Muller*; *William Mure*; *Hugh Nisbet*; *Robert Norton*; *Dr. Eduardo Prado*; *Tekoo Ram*; *Baron de Rio Branco*; *Wright Schofield*; *Captain J. R. B. Serjeant, R.E.*; *George Augustus Simcox*; *Francis Geo. Smith, B.A.*; *General Sir Henry Augustus, K.C.M.G.*; *William Taylor*; *Alexander Whitelaw*; *Martin Leonard Winterton*; *Count Wilby de Wagner*; *Rev. D. Grenville Lewis*; *T. Douglas Murray*; *Sidney Whitman.*

The Paper read was:—

"A Journey to Tafilet, Morocco." By Walter B. Harris.

The PRESIDENT said: At our last meeting I announced to you the improvements we have been making in the Society's premises, and I have since found so many Fellows who are scarcely acquainted with the treasures we possess there and the comforts that have been introduced for your use, that I have decided upon inviting the Fellows to a reception in the afternoon—a sort of afternoon tea—about the first week of December, when I hope a good many Fellows will come and go over the premises, to see for themselves what their possessions are, and the immense value of the great library, the collection of maps, and the facilities now afforded to study them.

Third Ordinary Meeting, December 10, 1894.—CLEMENTS R. MARKHAM, ESQ., C.B., F.R.S., President, in the Chair.

ELECTIONS.—*Lieutenant William Henry Barham, R.N.R.; John Boyle; Edward Oliver Goodinge; Major H. M. Lawson, R.E.; Henry Lester Lewis; Carl Bogue Luffman; Edward John Payne; Major William Peacocke, R.E., C.M.G.; Harry Jones Thaddeus.*

The Paper read was :—

" On Kolguef, in Barents Sea." By Aubyn Trevor Battye.

GEOGRAPHICAL LITERATURE OF THE MONTH.

Additions to the Library.

By HUGH ROBERT MILL, D.Sc., *Librarian*, R.G.S.

THE following abbreviations of nouns and the adjectives derived from them are employed to indicate the source of articles from other publications. Geographical names are in each case written in full :—

A. = Academy, Academie, Akademie.
Ann. = Annals, Annales, Annalen.
B. = Bulletin, Bollettino, Boletim.
Com. = Commerce, Commercial.
C. R. = Comptes Rendus.
Erdk. = Erdkunde.
G. = Geography, Geographie, Geografia.
Ges. = Gesellschaft.
I. = Institute, Institution.
J. = Journal.
M. = Mitteilungen.
Mag. = Magazine.
P. = Proceedings.
R. = Royal.
Rev. = Review, Revue, Revista.
S. = Society, Société, Selskab.
Sitzb. = Sitzungsbericht.
T. = Transactions.
V. = Verein.
Verh. = Verhandlungen.
W. = Wissenschaft, and compounds.
Z. = Zeitschrift.

On account of the ambiguity of the words *octavo*, *quarto*, etc., the size of books in the list below is denoted by the length and breadth of the cover in inches to the nearest half-inch. The size of the *Journal* is 10 × 6½.

EUROPE.

Alps. **Conway.**

An Alpine Journal. By W. M. Conway. From the *Contemporary Review*, August, 1894.

Notes of mountaineering in the Ligurian Alps, Mr. Conway being accompanied by two of the Gurkhas who accompanied him in his Karakoram journey.

England and Wales—Canals. **Wells.**

Mem. P. Manchester Lit. and Phil. S. 8 (1894) : 187–204.

A sketch of the history of the Canal and River Navigations of England and Wales and of their present condition, with suggestions for their future development. By Lionel B. Wells.

This paper is accompanied by the excellent map of English canals and navigable rivers, prepared by Messrs. Wells and Swindells.

France—Rochefort. *B.S.G. Rochefort* 16 (1894): 173–179. **Fonteneau.**

Contributions à l'étude de la géographie historique de Rochefort et de la région.

The notes are printed from the manuscripts written by Dom Fonteneau as a commentary on a map executed from surveys completed in 1700.

Greece—Earthquakes. *Petermanns M.* 40 (1894): 217–227. **Mitzopulos.**
Die Erdbeben von Theben und Lokris in den Jahren 1893 und 1894. Von. Prof. Dr. Constantin Mitzopulos in Athens.

Ireland—Achill Island. **Hayes.**
A Holiday in the Far West. Achill Island. [By A. J. Hayes.] With sketches by Charles Whymper. From the *Leisure Hour*, August, 1894.

Italy—Lakes. *B.S G. Italiana* (III.) 7 (1894): 710–740. **Marinelli.**
Aggruppamenti principali dei laghi italiani, Osservazioni del Socio Olinto Marinelli. *With Maps.*

The Italian lakes are grouped in this paper according to their origin as *Cirque lakes*, found in the higher Alps; *Alpine valley lakes*; the great *Subalpine lakes*, with a bathymetrical sketch-map of Lago Maggiore; *Morainic lakes*, in the centre of moraine amphitheatres; *Karst lakes*; *Crater lakes*; and *Coast lakes*.

Lipari Islands. **Ludwig Salvator.**
Die Liparischen Inseln. Achtes Heft; Allgemeiner Theil. Prague: H. Mercy, 1894. Size 16½ × 13, pp. x. and 160. *Map, Plan, and Illustrations. Presented by the Archduke Ludwig Salvator.*

By the publication of the present part this magnificent work on the Lipari islands is completed. Former instalments dealt fully with the detailed geography of the islands; the concluding part deals with generalities regarding climate, population, agriculture, staple products, hunting, fishing, shipping, mining, manufactures, and trade. For sumptuous paper and typography alone the work is unique; the illustrations are fine woodcuts, and the maps splendidly engraved and coloured.

Norway—Finmark. **Lindesay.**
Rambles in Norsk Finmarken. By George Lindesay. From the *Fortnightly Review*, November, 1894.

The narrative of a fishing-expedition, with many references to minor natural history.

Norway—Gravity Observations. **Schiötz.**
Die norwegische Commission der Europäischen Gradmessung. Resultate der im Sommer 1893 in dem nördlichsten Theile Norwegens ausgeführten Pendelbeobachtungen nebst einer Untersuchung über den Einfluss von Bodenerschütterungen auf die Schwingungszeit eines Pendels. Von O. E. Schiötz, Christiania, 1894. Size 11 × 7, pp. 42.

Russia—Crimea. **Wood.**
The Crimea in 1854 and 1894. By General Sir Evelyn Wood, G.C.B., etc. From the *Fortnightly Review*, October, November, and December, 1894.
With plans of the Crimean battle-fields.

Russia—Southern Forests. **Tanfiljew.**
Die Waldgränzen in Südrussland (Mit einer Waldkarte). Von G. I. Tanfiljew. St. Petersburg, 1894. Size 10 × 6½, pp. 176. *Presented by the Author.*

The text of this work is in Russian, but there is a short German abstract. The four chapters are respectively entitled—Considerations as to the Treeless Character of the Steppes, The Soil and Vegetation of the Black Earth Region, Connection between the Forest and Steppelands, and The Pine-woods of the Steppe Region.

Russia. **Leroy-Beaulieu.**
The Empire of the Tsars and the Russians. By Anatole Leroy-Beaulieu. Translated from the Third French Edition with Annotations, by Zénaïde A. Ragozin. Part I.—The Country and its Inhabitants. Part II.—The Institutions. New York and London, G. P. Putnam's Sons, 1893–94. Size 9½ × 6½, pp. (Pt. I.) xx. and 588; (Pt. II.) ix. and 566. *Maps. Price (each vol.) 12s. 6d. Presented by the Publishers.*

This is an excellent translation by a Russian of M. Leroy-Beaulieu's work on Russia. The volumes are illustrated by several maps, the source of which is not stated. The work is divided into "Books," dealing, in Part I., "The Country and its Inhabitants," respectively with nature, climate and soil, races and nationality, the national temperament and character, history and the elements of civilization, the social hierarchy, nobility and tchin, the peasant and the emancipation, Mir, family, and village communities. Part II., "The Institutions," deals with the forms of government and administration, with justice, the press, and revolutionary agitation. The translator also annotates the original work, supplying a series of valuable footnotes and appendices, which is of considerable assistance to the English reader who wishes to understand the Russia of to-day.

Scotland—Ben Nevis. **Whymper.**

The Observatory on the summit of Ben Nevis. By Edward Whymper. From the *Leisure Hour* for September, 1894. *With Illustrations.*

Scotland—Glaciation. *P. Philosophical S. Glasgow* (1893–94) **25**: 118–136. **Bell.**

On the Glaciation of the West of Scotland. By Dugald Bell. *With Map and Plates.*

Mr. Bell writes from long personal knowledge of the country, and has carefully weighed the evidence with regard to the various interpretations of the phenomena observed.

Scotland—Shetland. *P. Philosoph. S. Glasgow* (1893–94) **25**: 108–117. **Ross.**

Some Notes on the Place-Names and Dialect of Shetland. By David Ross.

Switzerland. ———

Annuaire de la Suisse Pittoresque et Hygiénique. Stations de cures d'air, bains, belles excursions, villes d'hiver de la Méditerranée. Quatrième édition, 1894–1895. Lausanne: Bureau de la Bibliothèque Universelle. Size 6½ × 4½, pp. 532. *Illustrations. Price* 3*s.*

Switzerland. *Le Globe* **33** (1894): 1–60. **Coulin.**

Aperçu sur la Topographie en Suisse I. Historique et Travaux préliminaires, Lever de détail, Progrès de la Cartographie Fédérale. II. Sondages de nos Lacs. Par M. Horace-L. Coulin, ingr. topographe.

An account of the methods employed in the Swiss Surveys, which commenced in 1832 with the measurement of a base-line at Zurich. The Dufour map, on the scale of 1 : 100,000 in 25 sheets with hachures, is kept up to date, corrections being entered on the original copper plates. A reduction on the scale of 1 : 250,000 is also kept up, the map being in four sheets. Finally the Siegfried Atlas contains about 560 sheets, on the scale of 1 : 50,000, or of 1 : 25,000, with contours. This map will be completed in a few years. A description of the methods of lake-sounding in use by the Swiss Survey includes an account of the manner in which the land and water surveys are combined on the official maps.

ASIA.

Arabia and Palestine. **Hull.**

Aperçu de le Structure Géologique de l'Arabie Pétrée et de la Palestine. Par le Professeur Edward Hull. Liège: H. Vaillant-Carmanne, 1894. Size 9½ × 6½, pp. 15. *Presented by the Author.*

This paper was read at the Zürich meeting of the International Geological Congress. It is a concise summary of the results published in the 'Memoirs of the Palestine Exploration Fund' in 1886, under the title, "On the Physical Geology and Geography of Arabia-Petræa and Palestine."

China. **Landor.**

A Journey to the Sacred Mountain of Siao-outai-shan, China. By A. H. Savage Landor. From the *Fortnightly Review*, September, 1894.

China—Hakkaland. **Irving.**

A Ride in Hakkaland. By E. A. Irving. From *Blackwood's Magazine*, November, 1894.

Eastern Asia. **Gundry.**

Corea, China, and Japan. By R. S. Gundry. From the *Fortnightly Review*, November, 1894.

Summarizes the historical relations of the three countries.

Eastern Asia. *Verh. Ges. Erdk. Berlin* **21** (1894): 456–476. **Richthofen.**

Herr von Richthofen: Der Schauplatz des Krieges zwischen Japan und China.

A full abstract of this paper appears in the *Journal* for December, 1894.

India. **Schmidt.**

Reise nach Südindien. Von Emil Schmidt (Leipzig). Leipzig: W. Engelmann, 1894. Size 9½ × 6½, pp. viii. and 314. *Illustrations. Price* 8s.

Dr. Schmidt travelled in the south of India, visiting Madras, Travancore, the Nilgiri hills, Cochin, and the intervening districts, with the special object of making ethnographical observations.

India—Orissa. **Waddell.**

Identification of the old Orissan port of Chitratala, the "Che-li-ta-lo" of Hiuen Tsiang. By L. A. Waddell. From the *Proceedings* Asiatic Society of Bengal for December, 1892. Size 9 × 6½, pp. 3. *Presented by the Author.*

The port has been identified by Mr. Waddell at a distance of 50 miles inland from the present coast-line, thus furnishing a clue to the rate of the formation of the Mahanadi delta during the last 1250 years.

Indo-China. **Ehlers.**

In Sattel durch Indo-China. Von Otto E. Ehlers. 2 vols. 3rd edition. Berlin, 1894. Size 9 × 6, pp. (vol. i.) 332, (vol. ii.) 301. *Map and Illustrations. Price* 12s.

An interesting journey well described, with appropriate illustrations. The author went from Moulmein to the north-west of Siam, and, crossing into Tonkin, descended the Red River to Haiphong, returning by sea, with halts at various towns on the coast, to Singapore, Johore, and Bangkok.

Japan—Music. **Smith.**

The Music of Japan (with examples). By Miss Laura A. Smith. From the *Nineteenth Century*, December, 1894.

Karakoram Mountains. **Conway.**

Climbing and Exploration in the Karakoram Himalayas. By William Martin Conway. Containing Scientific Reports by Prof. T. G. Bonney, Dr. A. G. Butler, W. Martin Conway, W. Laurence, H. Duckworth, Lieut.-Col. A. G. Durand, W. Botting Hemsley, W. F. Kirby, Miss C. A. Raisin, and Prof. C. F. Roy. London: T. Fisher Unwin, 1894. Size 10 × 6½, pp. viii. and 127. *Map and Portrait. Price* 15s. *Presented by the Publisher.*

This volume completes the record of Mr. Conway's successful expedition to the Karakoram mountains, by presenting the scientific reports on his collections and the fine maps of the glacier region he traversed, which have been prepared and separately published by the Royal Geographical Society. The letterpress of the volume consists of nine papers. Mr. Conway himself gives a series of notes on the map, pointing out how a mountaineer's map of a mountain system differs from that of a government surveyor, for whom the "anatomy of the mountain" is less important than the form and extent of the valley floors and the position of the prominent peaks. He also gives a list of his measured altitudes. Colonel Durand contributes a general account of the Eastern Hindu Kush, Professor Bonney and Miss Raisin describe the rock specimens, Mr. W. Botting Hemsley treats of the plants, Mr. W. F. Kirby of the butterflies, and Dr. A. G. Butler of the moths. Mr. L. H. Duckworth describes two Nagyr skulls, and Professor C. Roy discourses on mountain sickness from Mr. Conway's notes.

Malay Archipelago—Horses. **Veth.**

Het Paard onder de Volken van het Maleische ras. Door Prof. P. J. Veth. Leiden: E. J. Brill, 1894. Size 9 × 6, pp. v. and 176.

A monograph on the horse in Malay lands, treating of the mythology of the subject, as well as of the present use of horses by different Malay peoples.

Pamirs. *Z. Ges. Erdk. Berlin* 29 (1894): 289-346. **Hedin.**

Forschungen über die physische Geographie des Hochlandes von Pamir im Frühjahr, 1894. Von Dr. Sven Hedin.

This long and valuable memoir is illustrated by a number of maps and sketches on the spot by the enterprising Swedish traveller, and published with a promptitude on which the Berlin Geographical Society must be congratulated.

Persia. **Morgan.**

Ministère de l'Instruction Publique, des Beaux-Arts et des Cultes. Mission scientifique en Perse. Par J. de Morgan. Tome Premier. Études Géographiques. Paris: E. Leroux, 1894. Size 11½ × 9, pp. xxxvi. and 427. *Maps and Illustrations. Price* 40s.

After short general descriptions of the Iranian plateau, its fauna, flora, inhabitants, and history, a more detailed account is given of the southern shores of the Caspian Sea, and of Aserbaijan. A long list of the place-names of the northern provinces of Persia is also given. There is a full index and a very complete set of illustrations, including 199 figures in the text and 58 full-page heliogravure photographic reproductions. Three succeeding volumes are intended to treat respectively of Linguistic and Ethnographic researches, Archæology, and Geology.

Philippine Islands. *B.S.G. Madrid* 36 (1894): 129–153. **Aguilar.**

Estado actual y porvenir del Archipiélago Filipino. Conferencia dada el 20 de Marzo de 1894. Por D. José Nieto Aguilar.

Syria. **Carrel.**

In Syria. By Frederic Carrel. From the *Fortnightly Review*, October, 1894.

Sketches of contemporary life in Syria.

AFRICA.

British East Africa—Geology. **Gregory.**

Contributions to the Geology of British East Africa.—Part I., The Glacial Geology of Mount Kenya. By J. W. Gregory. From the *Quarterly Journal* of the Geological Society for November, 1894. Size 8½ × 5½. *Map and Illustrations. Presented by the Author.*

Eritrea. **Schweinfurth.**

Prof. Dr. G. Schweinfurth. Il mio recente viaggio col Dr. Max Schoeller nell' Eritrea Italiana. Estratto dal Bollettino della Società d'Esplorazione Commerciale in Africa. Milan: P. B. Bellini, 1894. Size 10½ × 7½, pp. 35. *Plates. Presented by the Author.*

A preliminary abstract of Prof. Schweinfurth's detailed account of his recent journey in Italian East Africa, published in the *Zeitschrift* of the Berlin Geographical Society.

Madagascar. **Blind.**

The Fictitious French Claim to Madagascar. By Karl Blind. From the *Contemporary Review*, December, 1894.

Madagascar. **Martineau.**

Étude de Politique Contemporaine. Madagascar en 1894. Par A. Martineau. Paris: E. Flammarion [1894]. Size 9½ × 6, pp. vii. and 500. *Map. Price* 8s.

This volume gives an account of the history of French relations with Madagascar, and of the various treaties and arrangements made between the French and the Hova government. There are also particulars as to the Hova army and the commerce of the island.

Madagascar—Majunga. *Rev. Maritime* 123 (1894): 310–338. **Landrieu.**

Majunga, son importance, son avenir. Par M. G. Landrieu.

A description of the town of Majunga and of the manners of its inhabitants, including the *menu* of a dinner of 130 courses. The principal imports in order of value are rum, absinthe, and cotton goods; the chief exports are indiarubber and hides. M. Landrieu considers that an expeditionary force could reach Antananarivo more easily by Majunga than by Tamatave.

Morocco. **Kerr.**

Pioneering in Morocco: a Record of Seven Years' Medical Mission Work in the palace and the hut. By Dr. Robert Kerr, as agent of the Presbyterian Church of England. London: H. R. Allenson [1894]. Size 8 × 5½, pp. 251. *Illustrations. Price* 3s. 6d. *Presented by the Publisher.*

The record contained in this little book is written from the missionary standpoint exclusively. A reproduction of a Moorish map of the world is given, which resembles the mediæval wheel-maps, but has the directions of east and west reversed.

Morocco—Tafilet. *B.S.G. Paris* 15 (1894): 199–227. **Delbrel.**

Notes sur le Tafilet. Par Gabriel Delbrel.

Notes from memory on the oasis of Tafilet, which was several times visited by M. Delbrel while a prisoner in Morocco. His taste for drawing gained him the friendship of the present emperor, who gave him a certain amount of liberty, sufficient to enable him to see a good deal of Tafilet, and ultimately to escape to Mazagan, whence he returned to France.

South Africa—Game. **Bryden.**

The Extermination of great game in South Africa. By H. A. Bryden. From the *Fortnightly Review*, October, 1894.

NORTH AMERICA.

Alaska—Mount St. Elias. **Russell.**

Second Expedition to Mount St. Elias, by Israel Cook Russell. In the Thirteenth Annual Report of the United States Geological Survey, 1891-92. Part II.—Geology. Washington: Government Printing Office, 1893. Size 11½ × 8, pp. 1-91. *Maps and Plates.*

The complete and authoritative record of this expedition, preliminary reports of which have frequently been referred to in the *Journal*. A large part of the memoir is occupied with the description of the great Malaspina glacier, and its remarkable forest-clad moraines.

American Palæozoic Geography. **Walcott.**

The North American Continent during Cambrian time. By Charles Doolittle Walcott. In the Twelfth Annual Report of the United States Geological Survey, 1890-91. Part. I.—Geology. Washington: Government Printing Office, 1891. Size 11½ × 8, pp. 524-568. *Map and Sections.*

Canada. **Dawson.**

The Royal Society of Canada. Presidential Address of 1894. The Progress and trend of Scientific Investigation in Canada. By George M. Dawson. Ottawa, 1894. Size 12 × 9, pp. 17. *Presented by the Author.*

United States. **Gannett.**

The Average Elevation of the United States. By Henry Gannett. In the Thirteenth Annual Report of the United States Geological Survey, 1891-92. Part II. Geology. Washington: Government Printing Office, 1893. Size 11½ × 8, pp. 283-289.

The results of this investigation have been given in the *Journal*, vol. iii. (1894), p. 333.

United States. **Shaler.**

The United States of America. A study of the American Commonwealth, its Natural Resources, People, Industries, Manufactures, Commerce, and its work in Literature, Science, Education, and Self-Government. Edited by Nathaniel Southgate Shaler. 2 vols. London: Sampson Low & Co., 1894. Size 10½ × 7, pp. (vol. i.) xxv. and 670, (vol. ii.) viii. and 649. *Maps and Plates. Price* 36*s*.

These large volumes are the joint production of Professor Shaler and a number of collaborators, each chapter being signed by the author. Thus Professor Shaler appears to be the writer of the six chapters dealing with the general and physical geography of the United States; the ethnographical, political, social, and economic sections being contributed by Major Powell, Mr. H. H. Bancroft, Colonel Dodge, and twenty other specialists.

United States—California. **Hutchings.**

Souvenir of California. Yo Semite Valley and the Big Trees. What to see and how to see it. By J. M. Hutchings. San Francisco: J. M. Hutchings [1894]. Size 7 × 5, pp. 101. *Maps and Illustrations. Presented by the Author.*

A neat and compact guide-book, excellently illustrated.

United States—District of Columbia. *National G. Mag.* 6 (1894): 149-178. **Baker.**

Surveys and Maps of the District of Columbia. Marcus Baker. *With Plate.*

This paper will be specially noticed in the Monthly Record.

United States Geological Survey. **Powell.**

Twelfth Annual Report of the United States Geological Survey to the Secretary of the Interior, 1890-91. By J. W. Powell, Director. Part I.—Geology. Part II.—Irrigation. Thirteenth ditto, 1891-92. By J. W. Powell. In Three Parts. Part I.—Report of the Director; Part II.—

Geology; Part III.—Irrigation. Washington: Government Printing Office, 1891–93. Size 11½ × 8. *Maps and Plates. Presented by the U.S. Geological Survey.*

United States—New York. ———

Report on the progress of the State Land Survey of the State of New York. Albany, 1891. Size 9 × 6, pp. 306. *Maps and Plates. Presented by Mr. Verplanck Colvin.*

This report gives a quantity of miscellaneous information about the Adirondack region of New York State, its fauna, flora, and the survey of boundary-lines, with some illustrations of the scenery of the district, and sketch-maps on the scale of 1 : 1000 of certain small areas of the region.

CENTRAL AND SOUTH AMERICA.

Argentine—Magnetism. *B.A. Nacional Ciencas Cordoba* 12 (1892): 321–369. **Doering.**

Las manifestaciones del Magnetismo Terrestre en la provincia de Cordoba. Por Oscar Doering.

The observations on the magnetic elements made in 1890 are compared with the earlier work of Mac Rae in 1852, and of an Argentine Commission in 1882.

British Guiana. *J. R. Colonial I.* 26 (1894–5): 37–40. **Dixon.**

The Possibilities of the North-West District of British Guiana. By George G. Dixon.

Paraguay. *B.S.G. Italiana* 7 (1894): 695–710. **Balzan.**

Da Trinidad a S. Cruz de la Sierra e Corumbà e ritorno al Paraguay. Dal Prof. Luigi Balzan.

Previous notes of this journey were given in the *Bollettino* of the Italian Geographical Society for 1893, pp. 454, and 920, and for 1894, p. 61.

Peru—Chanchamayo. *B.S.G. Lima* 4 (1894): 1–32. **Carranza.**

Geografia descriptiva y estadistica industrial de Chanchamayo. Por D. Albino Carranza.

South America. **Jonin.**

Alexander Jonin. Durch Süd-Amerika, Reise- und Kulturhistorische Bilder. Erster Band. Die Pampa-Länder. Autorisierte und vom Autor bis auf die neueste Zeit vervollständigte Ausgabe des russischen Originals übersetzt von M. v. Pezold. Berlin, S. Cronbach, 1895 (1894). Size 9 × 6, pp. xi. and 943. *Price* 15*s*.

The author spent a considerable time in South America, and the object of his work is to give as vivid an account as possible of the continent in its relation to plants, animals, and man. The present volume deals with Southern Brazil, Uruguay, Paraguay, and the Argentine Republic in a large number of short interesting chapters. There are neither illustrations nor maps.

AUSTRALASIA.

Antipodes Island. **Chapman.**

Cast away on Antipodes Island. By J. Revans Chapman. From the *Leisure Hour*, September, 1894. *With Illustrations.*

Australian Exploration. **Thynne.**

The Story of Australian Exploration. By R. Thynne. London: T. Fisher Unwin, 1894. Size 8 × 5, pp. vi. and 277. *Map and Illustrations. Price* 5*s*.

The narrative is attractive reading for boys, telling the story of Australian inland exploration like a novel.

Fiji Islands. *P. and T. Queensland Br. R G.S. Australasia* 9 (1893–94): 22–51. **Thomson.**

Viti. By J. P. Thomson.

A revised and enlarged edition of the paper by the same author which appeared in the *Scottish Geographical Magazine* for March, 1894.

Pacific Islands. **Guillemard.**

Stanford's Compendium of Geography and Travel (New Issue). Australasia. Vol. II. Malaysia and the Pacific Archipelagoes. Edited and greatly extended from Dr. A. R. Wallace's 'Australasia.' By F. H. H. Guillemard. London, E. Stanford, 1894. Size 8 × 5¼, pp. xvi. and 574. *Maps and Illustrations. Price* 15*s*. *Presented by the Publisher.*

This is practically a new work, which gives a full and satisfactory general account of the islands of the Malay Archipelago, Melanesia, and Mikronesia. The illustrations, although not numerous, are appropriate, and there is a sufficient supply of maps on a fair scale to enable the reader to follow all the descriptions.

Polynesia. *Rev. G.* 18 (1894): 353–370. **Barré.**

P. Barré, La conquête de l'Océanie par les nations européennes. *With Map.*

The map is a rough and not very legible sketch showing the dates of annexation by European powers of the various parts of Australasia and the islands of the Pacific, but a series of clear statistical tables gives all the dates, areas, and populations in a convenient and useful way.

Western Australia—Mining Handbook. **Woodward.**

Mining Handbook to the Colony of Western Australia, written especially for Prospectors and Strangers to the Colony who are interested in Mining. By Harry P. Woodward, Government Geologist. Perth, 1894. Size 9½ × 6, pp. 126. *Maps and Plates. Presented by the Agent-General for Western Australia.*

At the present time this official statement should be very useful to all those interested in the development of the mineral resources, and especially the gold, of Western Australia. It is written in a popular manner, but aims to give a scientific account of the minerals and their distribution. Hints to prospectors, a glossary of mining terms, and a statement of the means of reaching and travelling through the colony are appended.

POLAR REGIONS.

Antarctic Regions. **Murdoch.**

From Edinburgh to the Antarctic. An Artist's Notes and Sketches during the Dundee Antarctic Expedition of 1892–93. By W. G. Burn Murdoch. With a Chapter by W. S. Bruce, Naturalist of the barque *Balæna*. London: Longmans & Co., 1894. Size 9½ × 6, pp. ix. and 364. *Chart and Illustrations. Price 18s. Presented by the Publishers.*

Mr. Burn Murdoch, it will be remembered, accompanied the Dundee whaling expedition to the Antarctic regions in 1892–93, a scientific report on which was presented to the Society by Mr. W. S. Bruce. The narrative is richly illustrated by the author's clear and characteristic sketches, and gives a lively record of a very unconventional voyage. Incidentally it throws light on the reasons which led to the geographical barrenness of the expedition.

Arctic Exploration. *Cosmos* 11 (1892-93): 348–359. **Cora.**

Le Spedizioni di R. E. Peary nella Groenlandia Nord (1891–92, 1893 e seq.). Cenni del prof. Guido Cora.

Professor Guido Cora illustrates his *résumé* of the results of Peary's first journey by a splendidly executed map of the Arctic regions in the neighbourhood of Smith Sound, which should possess interest for a wider public than that of Italy. The names on the map are all in English, and the work is compiled almost exclusively from British and American sources.

MATHEMATICAL AND PHYSICAL GEOGRAPHY.

Astronomy—Catalogue of Stars. **Stone.**

Catalogue of 6424 Stars for the epoch 1890. Formed from Observations made at the Radcliffe Observatory, Oxford, during the years 1880–1893. Under the superintendence of Edward James Stone. Oxford, J. Parker and Co., 1894. Size 11½ × 9, pp. xv. and 287. *Presented by the Radcliffe Trustees.*

Earthquakes. *Actes S. Sci. Chili* 4 (1894): 37–55. **Krahnass.**

A. Krahnass, Coïncidence des phénomènes météorologiques et des tremblements de terre avec les maxima et les minima d'attraction lunaire et solaire verticale pour un lieu donné (avec tableaux).

Geodesy. *M. Militär-G. I. Wien* 13 (1893): 74–167. **Sterneck.**

Die Polhöhe und ihre Schwankungen, beobachtet auf der Sternwarte des k. und k. militär-geographischen Institutes zu Wien. Von Oberstlieutenant Robert von Sterneck.

The variation of latitude at Vienna was found, as the result of fourteen months' observations, to amount to 0″·22 with a period of twelve months.

Magnetic Conditions. *Mem. P. Manchester Lit. & Phil. S.* 8 (1894): 181–186. **Wilde.**

On the Influence of the Configuration and Direction of Coast Lines upon the Rate and Range of the Secular Magnetic Declination. By Henry Wilde.

Mr. Wilde has arrived at a new theory of the cause and changes of terrestrial magnetism in consequence of experiments with his magnetarium, and he attributes to the oceans an effect similar to that produced by a partial covering of thin sheet-iron on his electrical model. In consequence of this he is inclined to doubt the actual truth of the symmetrical lines shown on the variation charts, which represent the isogonals passing unchanged from land to sea, and he suggests as a practical application that special care should be taken in navigation "off the greatly extended coast-lines of deep seas, where the rate and range of the secular declination are large in amount."

NEW MAPS.

By J. Coles, *Map Curator*, R.G.S.

EUROPE.

England and Wales. **Ordnance Survey.**

Publications issued since November 8, 1894.

1-inch :—

England and Wales:—151 (192, 209), 213 (226, 227), 228, 231, 310, 311, engraved in outline; 147, 158, 173, 176, 186, 187, hills photozincographed in brown, 1*s.* each.

6-inch—County Maps :—

England and Wales:—**Lancashire,** 58 N.E., 59 N.W., N.E., S.W., 68 N.W., S.W., 75 N.E., S.W., 76 N.E., 79 N.W., N.E., S.W., 82 N.E., 83 N.E., S.W., S.E., 84 S.W., S.E., 85 N.W., 86 N.W., 87 N.W., 88 S.W., 90 N.W., N.E., 91 N.E., 92 N.W., N.E., S.W., S.E., 93 N.W., N.E., S.W., S.E., 94 N.E., S.E., 95 S.E., 96 N.W., S.E., 98 N.W., S.E., 100 N.E., 102 N.W., 103 N.E., 104 N.E., 106 S.E., 107 N.W., 108 N.W., 113 S.W., 114 S.W., 117 S.E., 1*s.* each. **Yorkshire,** 215 N.W., N.E., S.E., 217 N.W., 230 S.W., 232 N.W., 234 S.W., 248 N.E., 273 N.E., 279 N.E., 294 S.E., 299 N.E., 1*s.* each.

25-inch—Parish Maps :—

England and Wales:—**Lancashire,** LXII. 11, 4*s.*; 12, 5*s.*; 15, 11*s.* 6*d.*; 16, 20*s.* 6*d.*; LXX. 3, 11*s.* 6*d.*; 4, 8*s.*; CV. 8, 8*s.*; 11, 8*s.*; 12, 4*s.* **Yorkshire,** XVIII. 16, 4*s.*; XIX. 6, 4*s.*; XXX. 8, 3*s.* (coloured).

Town Plans—5-feet scale :—

London (Revision), VI. 28, with houses stippled, 2*s.* 6*d.*

———— 10-feet scale :—

London—Re-survey (Hornsey Parish), III. 34, 4; III. 44, 3; III. 52, 2; III. 53, 1; III. 75, 1, with houses stippled, 2*s.* 6*d.* each.

(*E. Stanford, Agent.*)

Germany. **Königl. Preuss. Landes-Aufnahme.**

Karte des Deutschen Reiches. Scale 1 : 100,000 or 1·7 stat. miles to an inch. Herausgegeben von der Kartogr. Abtheilung der Königl. Preuss. Landes-Aufnahme, 1894. Sheets: 157 Labes, 246 Königsberg i. d. Neum, 250 Czarnikau, 275 Samter. *Price* 1.50 *marks each sheet.*

Switzerland. **Heim & Schmidt.**

Geologische Karte der Schweiz. Auf Grundlage der Beiträge zur geolog. Karte der Schweiz und der neuesten Materialien, sowie unter Mitwirkung der Herren Renevier, Rollier, Schardt, Lugeon, Mühlberg, Penck, etc., bearbeitet im Auftrage der Schweizerischen geologischen Commission von Dr. Alb. Heim and Dr. C. Schmidt. Topogr. Grundlage von R. Leuzinger. Farbendruck v. der topogr. Anstalt Winterthur. Scale 1 : 500,000 or 7·9 stat. miles to an inch.

In the preparation of this map, Leuzinger's "Relief-Karte der Schweiz" has been used as a basis. The colours to illustrate the geological features have been well chosen, and it is in all respects an excellent specimen of cartography.

ASIA.

Indian Government Surveys. **Surveyor-General of India.**

Indian Atlas. 4 miles to an inch. Sheets: No. 103, parts of districts Azimgurh, Ghazipur, and Benares (N.W. Provinces), Tirhut, Sarun, Patna, Sharabad and Gya (Bengal).—Quarter Sheets: Nos. 1 N.E., parts of districts Shikarpur, Karachi, and Hyderabad and Khairpur State (Sind, Bombay Presidency); 8 N.E., parts of districts Dera Ghazi Khan, Bahawalpur (Native State); 9 S.E., part of Khairpur Native State (Sind, Bombay Presidency); 22 N.W., parts of Kathiawar, Cutch, and Palanpur Agencies, of district Ahmedabad and of Native State Baroda (Gujarat, Bombay Presidency); 35 N.E., parts of Native States Gwalior and Indore (Central India Agency), and of Udaypur, Tank, Bundi, and Jhallawar (Rajputana Agency); 61 N.W., part of district Mysore (Mysore); 69 S.E., parts of Panna, Chark, and Chhatarpur (Native States, Bundelkhand Agency), and of districts Hamipur, Futtehpur, and Banda (N.W. Provinces); 86 S.W., parts of districts Kheri and Bahraich of Oudh and Native State Nepal; 92 N.E., parts of districts Raipur, and of Native States Patna, Kalahandi, Kanker, Bastar (C. Provinces and Jeypore (Vizagapatam Agency), Madras Presidency; 131 S.W., portions of districts Cachar and North Lushai Hills, and of Manipur Native State (Assam).—India showing Railways, scale 96 miles to an inch, corrected up to March 31, 1894.—Bengal Survey, 1 inch to a mile, Sheet No. 222, districts Balasore and Cuttack, Killa Kanika and Killa Kujang, Season 1888–90; No. 248, districts Cuttack and Balasore (Killa Kanika), Seasons 1888-90.—Bombay Survey, 1 inch to a mile, No. 158, parts of Surat and Nasik Districts, and Bansda Dharampur, Baroda and Surgana States, Seasons 1881-85 and 1891-92; No. 240, portions of Native States under Kolhápur Agency and Belgaum District, Season 1891-92; No. 273, portions of Belgaum District and Native States under Kolhapur Agency, Seasons 1890-92.—Lower Burma Survey, 1 inch to a mile, districts Hanthawaddy and Thongwa, Seasons 1880-81 and 1889-91; No. 237, district Thongwa, Seasons 1889-91.—N.W. Provinces and Oudh Survey, 1 inch to a mile, No. 97, districts Naini Tal and Bareilly, Seasons 1866-67, 1871-73, and 1886-89.—Index to the Survey of Forest Reserves in the Jhansi District, Seasons 1888-90, scale 2¼ miles to an inch.—Hyderabad Survey, scale 1 inch to 2 miles, Sheets Nos. 202, 203, 212, and 213, part of Khamamet Circar.—Central India and Rajputana Survey, 1 inch to a mile, No. 382, part of Gwalior (C. I. Agency), Season 1862-63.—Index to the Standard Sheets of the Central Provinces, 32 miles to an inch, May, 1894.—Mysore, Skeleton Edition, 13 miles to an inch, with the addition of the Province of Coorg, and railways up to February, 1894.—District Katha, Upper Burma, 4 miles to an inch, March, 1894.—District Goalpara, Assam, 4 miles to an inch, with additions and corrections up to October, 1893.—District Bhagalpur, Lower Provinces, Bengal, 4 miles to an inch, 2nd edition, with additions and corrections up to June, 1892.—District Amritsar, 2 miles to an inch, with additions and corrections up to July, 1888 (2 sheets).—Pilibhit, N.W. Provinces and Oudh, 8 miles to an inch, 1892.—District Merwara, Rajputana, 8 miles to an inch, 1894.—District Mainpura, N.W. Provinces and Oudh, 8 miles to an inch, 1891. District Allahabad, N.W. Provinces and Oudh, 8 miles to an inch, 1892.—District Basti, N.W. Provinces and Oudh, 8 miles to an inch, 1891.— District Benares, N.W. Provinces and Oudh, 8 miles to an inch.—District Bulandshahr, N.W. Provinces and Oudh, 8 miles to an inch, 1891.—District Dehra Dun, N.W. Provinces and Oudh, 8 miles to an inch, 1891.—District Etawah, N.W. Provinces and Oudh, 8 miles to an inch, 1891.—District Gonda, N.W. Provinces and Oudh, 8 miles to an inch, 1890.—District Gorakhpur, N.W. Provinces and Oudh, 8 miles to an inch, 1891.—District Jhansi, N.W. Provinces and Oudh, 12 miles to an inch, 1894.—District Hazaribagh, Bengal, 8 miles to an inch, 1894.—District Champaran, Bengal, 8 miles to an inch, 1891. *Presented by H.M. Secretary of State for India, through India Office.*

AFRICA.

East Africa. **Baumann.**

Karte des Forschungsgebietes der Massai-Expedition des Deutschen Antisklaverei-Komite. Nach den Originalaufnahmen von Dr. Oscar

Baumann, reduziert von Dr. Bruno Hassenstein. Scale 1: 1,500,000 or 23·5 stat. miles to an inch. Berlin: Dietrich Reimer, Hoefer and Vohsen, 1894.

In addition to the principal map, on which the results of Dr. Oscar Baumann's explorations are shown, there are two insets, one being a geological sketch-map of German East Africa, and the other an ethnographical sketch-map of the same region. The proposed route for the railway between Tanga and Speke Gulf, Victoria Nyanza, is laid down, periodical and permanent water-courses are distinguished by the manner in which they are drawn, and heights are given in metres.

East Africa. **Kiepert.**

Karte der Nyaßa-Expedition des Gouverneurs Obersten Freiherrn von Schele. Nach den Aufnahmen des Kompagnieführers H. Ramsay, und mit Benutzung unveröffentlichter Aufnahmen von Lieut. Böhmer, Lieut. Fromm, Kompagnieführer Herrmann, Kapitän Prager, Stationskontrolleur Schmidt II., Dr. F. Stuhlmann und anderen, sowie des älteren Routenmaterials, konstruirt und gezeichnet von Dr. Richard Kiepert unter Mithülfe von Prof. Dr. Freiherr von Danckelman, Dr. M. Limpricht, M. Moisel und P. Sprigade. Scale 1:500,000 or 7·9 stat. miles to an inch. Berlin: Dietrich Reimer (Hoefer & Vohsen). 4 sheets.

This map, which has been compiled from the most recent and reliable material, includes all that portion of East Central Africa between Lat. 7° S. and 11° S. and Long. 34° E. and 40° E. The routes of all principal explorers are laid down, those followed by H. Ramsay being distinguished by being coloured red. Numerous notes with reference to the routes and descriptive of the country are given on the map, as well as a table explaining the meaning of the symbols and lettering employed.

Tunis. **Service géographique de l'Armée.**

Tunisie. Carte Reconnaissance. Scale 1 : 200,000 or 3·1 stat. miles to an inch. Publiée par le Service Géographique de l'Armée. Sheets:—XI. Kairouan; XVII. Gafsa; XVIII. El Ayaïcha; XIX. Maharès; XX. Nefta; XXI. Touzer; XXV. Ras El Kelb; XXVI. Redjem Matong; XXVII. Douz; XXVIII. Ksar Médenenine; XXIX. Zarzis; XXXI. El Merhotta; XXXII. Douirat. *Price* 70 *centimes each sheet.*

AMERICA.

Bolivia. **Idiáquez.**

Mapa Elemental de Bolivia por Eduardo Idiáquez, Ingeniero Civil. Scale 1: 3,400,000 or 53·4 stat. miles to an inch. La Paz, 1894. *Presented by the Author.*

Although somewhat roughly drawn, this map contains a great deal of useful information, and it has been carefully brought up to date. The limits of the republic, as well as those of departments, are laid down; the importance of towns or villages is indicated by the use of symbols; and railways in operation or projected, as well as roads, are shown.

GENERAL.

Exploration. **Schrader.**

L'Année Cartographique. Supplément Annuel á toutes les publications de Géographie et de Cartographie dressé et rédigé sous la direction de F. Schrader. Directeur des travaux cartographiques de la librairie Hachette et Cie. Quatrième Supplément. Contenant les Modifications Géographiques et Politiques de L'Année 1893. Deux feuilles de Cartes avec Texte Explicatif au dos. Librairie Hachette et Cie, Paris, 1894. *Prix* 2 *francs.*

The first sheet contains a map of Central Asia, on which the route surveys of Mr. Littledale, Capt. Bower, Mr. Rockhill, and M. Obroutcheff are shown; a map illustrating Dr. Yersin's journey in Cochin-China; and plans of the Kong rapids. A map of the state of Minas Geraes, on which the physical features appear considerably modified as the result of the investigations of M. Chrochkatt de Sá, is also given. The second sheet contains a map of Madagascar showing routes of recent explorers, a map showing Commandant Monteil's journey from Segusikoro to Lake Chad; Maistre's route from the Mobangi by way of Yola to the Niger; a map of Dahomey; and a map of Northern German East Africa, showing the routes of Dr. Baumann. Each sheet is accompanied by explanatory letterpress.

The World. **Johnston.**

The World-Wide Atlas of Modern Geography, Political and Physical. Containing one hundred and twelve plates and complete Index. With an Introduction by J. Scott Keltie. Second Edition. W. & A. K. Johnston, Edinburgh and London, 1894. *Presented by the Publishers.*

This is a new edition of an atlas which has been favourably noticed on a previous occasion.

The World. **Habenicht.**

Justus Perthes' See-Atlas. Eine Ergänzung zu Justus Perthes' Taschen-Atlas, entworfen und bearbeitet von Hermann Habenicht, 24 kolorierte Karten in Kupferstich mit 127 Hafenplänen. Mit nautischen Notizen und Tabellen von Erwin Knipping. Gotha: Justus Perthes, 1894. *Presented by the Author.*

This is a very useful little atlas for reference in all matters connected with seas or oceans. The introduction contains some useful statistical information in connection with the maps, which have been produced in a most satisfactory manner, and the atlas is well suited to the purpose for which it has been published.

Relief Maps. **Klemm.**

Relief Practice Maps of Europe, British Isles, Western Europe, Asia, Africa, North America, United States, New England States, North Central States, Middle Atlantic States, South Atlantic States, and South America. By L. R. Klemm, PH.D., New York. Patented 1888. Copyrighted 1894 by Wm. Beverley Harison, New York. *Price $1 each, or $10 per dozen. Presented by Wm. Beverley Harison, Esq.*

In this series of blank maps the relief has been produced, on specially prepared paper, by pressure. It is intended that they should be filled in by the student with the names of places, rivers, lakes, mountains, etc. They are very portable, and seem well suited for use in schools.

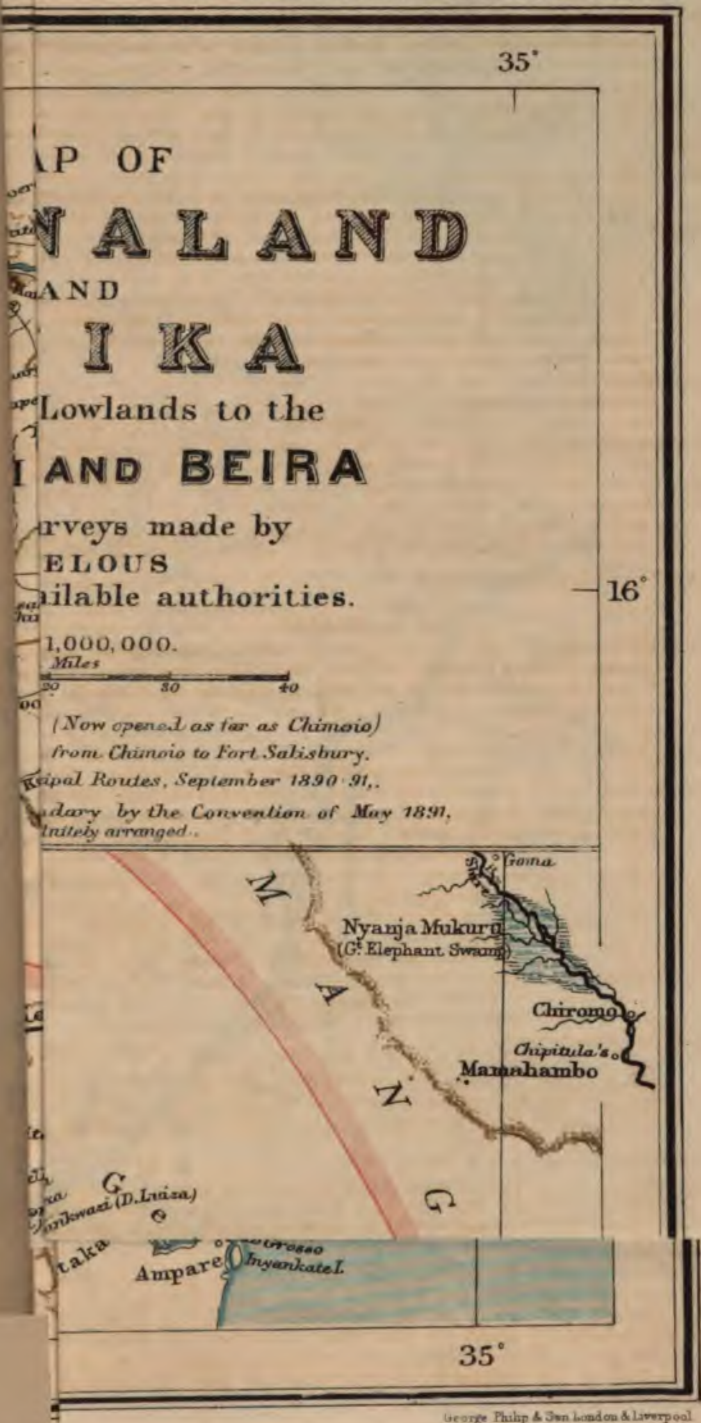
CHARTS.

Admiralty Charts. **Hydrographic Department, Admiralty.**

Charts and Plans published by the Hydrographic Department, Admiralty, September and October, 1894. *Presented by the Hydrographic Department, Admiralty.*

No. Inches.
1652 m = 1·0 England, south coast:—Owers to Beachy Head. 3*s.* 6*d.*
2613 m = 0·49 France, north coast:—Cape Levi to Fécamp. 2*s.* 6*d.*
2612 m = 0·5 France, north coast:—Fécamp to Boulogne. 2*s.* 6*d.*
2148 m = 1·0 France, north coast:—Cayeux to Boulogne. 2*s.* 6*d.*
2142 m = 1·0 Newfoundland, south coast:—Ramea Islands to Indian harbour (plan Grand Bruit harbour). 3*s.* 6*d.*
1523 m = various. Ports and anchorages on the north coast of South America. 2*s.* 6*d.*
680 m = various. Anchorages on the east coast of Madagascar:—Tangtang harbour, Hastie road and port Choiseul, Angontsi road, Port Memoria, Vinambé bay. 1*s.* 6*d.*
2090 m = 6·0 Gulf of Aden:—Salt lake, Bud Ali, Tajura, Étoile and Boutres anchorages. 1*s.* 6*d.*
733 m = 2·0 Africa, Red Sea:—Hanfela bay. 1*s.* 6*d.*
2101 m = various. Plans in the Gulf of Siam:—Saracen bay, Pulo Panjang, Pulo Wai or Koh Kwang Noi. 1*s.*
2265 m = 5·0 Japan:—Kobé and Hiogo bays. 1*s.*
2128 m = various. Plans of the Kuril Islands. 1*s.* 6*d.*
1570 m = 0·25 New Hebrides islands:—Malo island to Efate island. 2*s.* 6*d.*
2225 m = 1·0 New Hebrides:—Ambrym island. 2*s.* 6*d.*
1259 Fusan harbour:—Plan added, Commemoration bay.
1019 Yu Lin Kan bay, Gaalong bay, etc.:—New Plans, Tai Chau or Tinhosa anchorages, Chun Lan harbour, Sama port.

N.B.—It would greatly add to the value of the collection of Photographs which has been established in the Map Room, if all the Fellows of the Society who have taken photographs during their travels, would forward copies of them to the Map Curator, by whom they will be acknowledged. Should the donor have purchased the photographs, it will be useful for reference if the name of the photographer and his address are given.



George Philip & Son London & Liverpool.

The

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KOLGUEFF ISLAND.*

By AUBYN TREVOR-BATTYE, F.L.S.

By far the most exhaustive account of Kolgueff at present written is given by Professor Saweljew, to whose own work I shall presently refer. From his paper (Erman's *Archives*, 1852, vol. x. p. 302, etc.) I take much of what immediately follows.

The first description of Kolgueff is in the fourth volume of Lepechin's 'Journey.' But Lepechin was never there. He took his account from an anonymous article in the *New Monthly Paper*, a Russian magazine of that time. The Russian maps of Kolgueff were then drawn either after the Dutch, or more probably after maps prepared by the Pomors of the coast. In 1823–24, Lütke, on his third and fourth voyages to Novaya Zemlya, crossed over to the shore of Kolgueff, determined the latitude and longitude of the north-western and the longitude of the western point, and took views of some points of the north-west coast. (I may here remark that the coast of Kolgueff is always changing, and I failed in every attempt to identify points from Lütke's projections.) Then in 1826 a separate expedition, under the command of the under-pilot Berejnyeh, was equipped for the survey of the coasts of the ocean to the mouth of the Pechora to the east; of the Tsekh Gulf; of the eastern shore of the Kanin peninsula; and of the island of Kolgueff. This expedition executed its commission during the two summer months, visiting all the points named, except the Tsekh Gulf. The surveys of Kolgueff were well accomplished, with Karbasses, in four days. Between July 21 and 25 the expedition circumnavigated the whole island; still up to the year 1841 the island had not been visited by a single naturalist. In that year Professor Saweljew and Dr. Ruprecht visited the island. They landed at the Waskina, and Dr. Ruprecht made an excursion thence with reindeer. They then tried to sail round the island. They landed at the Gosina and at the Konkina, but were then compelled by bad weather to desist, running for Sviatoi Nos. In August they again visited Kolgueff; this time they went to Sharok harbour, and again Dr. Ruprecht made an excursion; and now I will quote Saweljew's own words: "It must, however, be mentioned that our stay on Kolgueff was made under the most unfavourable conditions. Of the sixteen days which we passed at the mouth of the Waskina and in Stanavoi Sharok, the weather on ten was such that it was impossible to think of investigation and excursions on the island; the violent storms did not allow us once to leave the cabin. In spite of this drawback, Ruprecht succeeded in *completely describing* the flora of the island, while I was able to determine the latitude of the mouth of the Waskina, as well as to take observations on the inclination of the magnetic needle. Since this time, so far as I am aware, Kolgueff has been the goal of no other voyage of scientific inquiry."

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* Paper read at the Royal Geographical Society, December 12, 1894.

I may add to this, that, so far as I am aware, since this date (1841) no naturalist had visited Kolgueff until we went this year. I have not yet had an opportunity of comparing my plants (a list of which has been most kindly prepared for me by Dr. Carruthers) with Dr. Ruprecht's, but in one deduction at least he was out. So much lower is the temperature of Kolgueff, he says, than that of the mainland, that "*even the cloudberry does not ripen there.*" Now, I suspect I owe much of the good health I had on Kolgueff to the eating of ripe cloudberries, which we gathered by the bushel.

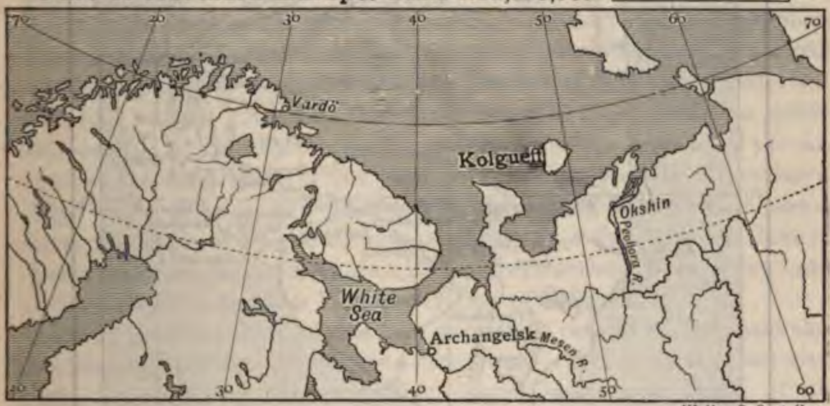
With the exception of scattered references—as, for instance, in the French 'Geographical Dictionary'—I can find nothing written about Kolgueff excepting the following (they are both in the Russian). The first, which appeared in 1832 in an important publication (*The Russian Review*, p. 284), is remarkable as the work of one who was profoundly indebted to his imagination for his facts: the whole account is a tissue of inaccuracies. The second is really a very quaintly curious paper; it is to be found in Maximow's 'Morskoi Sbornik.' It is the account by a priest (he does not divulge his name) who visited the island in 1852 for the purpose of baptizing the natives. He does not tell us from where he sailed—perhaps from Mezen, as he had, he says, 150 versts of sea to cross. He says that before he started he sang *Te Deums* during three days. Nevertheless, he was very sea-sick; though it is evident that he struggled manfully with this enemy, for, as he remarks with truth, "One cannot gain much lying on one's back." He gives further on a delightfully quaint description of goose-catching, which, in all essentials, agrees with our own experience. I may mention that on one occasion we caught at one haul of the net 3300 Brent geese.

With this we will leave the literature of Kolgueff, and turn to the island as we found it.

Kolgueff is, according to our chart, an island lying between 68° 43′ and 69° 30′ N. lat., and reaching from 48° 15′ to 49° 55′ east of Greenwich. Its southern point is 46 miles from Sviatoi Nos, which lies due south of it on the Timenskii coast, about 110 miles from Cape Kanin to the west, and 70 miles or so from the westerly point of the Pechora entry to the east.

Kolgueff lies in an exceedingly shallow sea, the soundings showing, on the west, south, and east sides, only about from 4 to 5 fathoms of water at 2 miles' distance from the coast. This condition accounts for the ill reputation which the island has always borne with navigators in those waters. To the south and east lie big sandbanks, which forbid a close approach to any but vessels of small size, excepting through the gulf which lies in a hollow of the sandbanks on the south-east. With the exception of this (which is exposed to the full force of the north-east gales, and they greatly predominate in that place), Kolgueff may be said to be without a harbour of any use to the chance navigator. For Sharok "harbour" on the east is not only approached by a channel of intricate character, demanding intimate local acquaintance, but is closed in by a bar, above which, in ordinary high tides, there is no more than from 7 to 8 feet of water.

Part of Northern Europe. Scale 1:20,000,000 English Miles 0 100 200 300

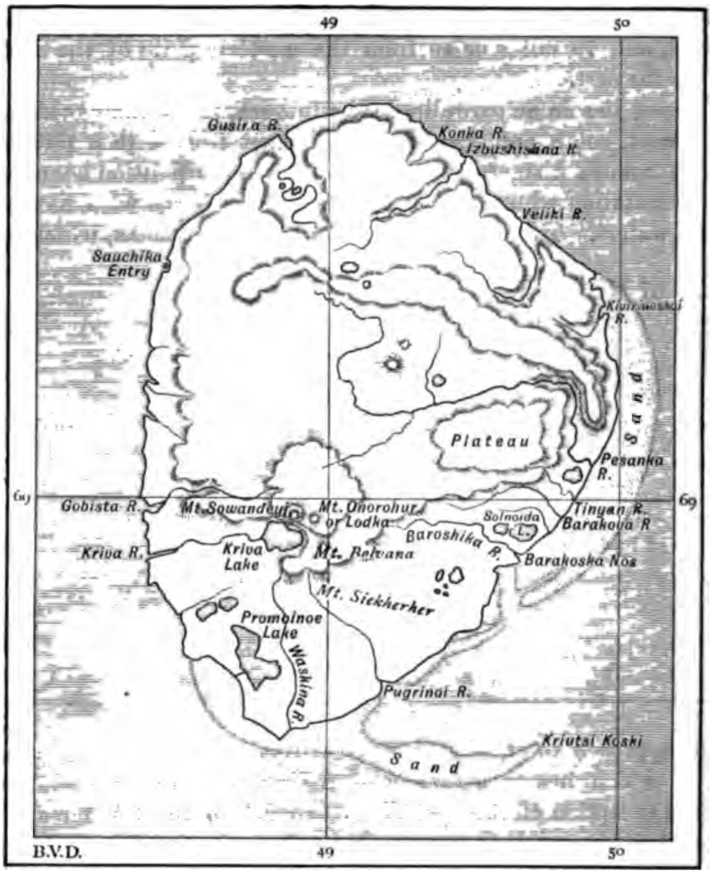


Walker & Boutall sc.

Of the rivers, the Waskina, Kriva, Gobista, Gosina are closed by a bar; the Pesanka debouches behind the sandbanks; and the Pugrinoy, though it has an open mouth, has in its estuary at high tide a bare 6 feet of water. Anchorage outside the island is everywhere either solid sand or (occasionally) clay, and is good and holding in character.

The cliffs highest to the north-west rise there no higher than 60 feet. No rock is visible in these cliffs. Everywhere they are either of yellow sand, grey sand containing small stones, or of green or bluish clay, according to the local section.

The superficial area of the island is sharply divisible into two portions. Speaking generally, the northern two-thirds are high ground, which consists of peat-covered or of bare ridges intersected by gullies and enclosing small lakes and swamps, and the remaining portion to the south is a dead flat of grass, bog, and peat-levels reaching down to the sea.



Kolgueff: from a sketch-map supplied by Mr. A. Trevor-Battye.

Scale 1:1,000,000 English Miles 10 5 0 10 20

Besides lakes innumerable of smaller size, there are two specially deserving of notice. The first, Promoince, or mountain lake, which is shown on the oldest plans I have seen of Kolgueff, and, according to my observations, is correctly entered on our chart, excepting that its eastern arm extends some half a mile further than is there indicated. The overflow from this lake passes on to the flats of the coast, and there forms a shallow basin which fills and empties at every tide, and would therefore now be incorrectly described in my view as shore *lake.* It seems not improbable, however, that when Saweljew saw it fifty years ago there was greater continuity of shore-line than there is at present. The second largest lake is interesting as being the source of the Kriva river, which leaves it at its south-western extremity. This lake, which is roughly rectangular in shape, is, according to the statements of the Samoyeds who fish in it, 21 feet deep at its deepest. Its southern shore-line is sandy, running by small inlets up into the grass of a flat plain among the hills; the northern shore is entirely composed of stone and boulders, apparently washed out of the higher ground, which there approaches it. There are no reed-beds in this lake; it is clear and clean in character. It abounds in "sik," a well-known species of bream (?), whose specific name I do not know. This fish has a very remarkable modification of the upper lip, doubtless to aid it in grubbing among stones. One of these fish, weighing about 2 lbs., which I took away from a glaucous gull which had just killed it, had its gullet full of small stones. According to the Samoyeds, the "goletz," a species of *salmo* (or of its ally *coregonus*), runs up into this lake from the sea. And as the small boat of our yacht was able to cross the Kriva bar at high water, there is no reason why it should not do so. This lake is always spoken of by the Samoyeds simply as "Tob," *i.e.* the lake; I heard no other name for it, though I always defined it as *Kriva* Lake. I have failed to find this lake in any map of Kolgueff.

I do not know how a large lake came to be entered on the chart close to Sharok harbour. There is no lake there. But there is a fair-sized lake, as this map shows, further inland, and again north of the Baroshika river (called by the Samoyeds Nioitsko Barko) lies a very beautiful and interesting lake with immense beds of reeds, which the Russians call Solnoida, but the Samoyeds Solnoi Toh. I have not only the Russian names (where these exist), but also the Samoyed names for almost all the physical features of Kolgueff, and in my thinking the map which gave them would be by that addition the more interesting. Everything points to a very ancient occupation of Kolgueff by Samoyeds. It is therefore possible that the meaning of their names, if it could be traced, might point to facts and customs which have now died out. I am only too sorry that my knowledge of the Samoyed language, though sufficient for everyday wants, does not allow me to follow out so promising a line of inquiry.

I have mentioned the Pugrinoy as a river which debouches on the gulf, and into which small boats or a small launch could enter. It is very strange that no mention should be made of the river on any map or chart that is available. But if instances were wanted to show how inadequate has been any previous examination of the island, the following facts would supply those instances: First, the Sauchika river, one of the western rivers so named on our chart, is not a river. At this point of the coast there is a double entry to a small tidal lagoon, which lies out of sight behind the cliff. Into it trickles only a little brook which you can step across. Secondly, the largest river of all has been missed altogether. This river is the Pesanka. I do not for one moment pretend that I have *accurately* mapped this river, or even that I have followed it from start to finish. But I have crossed it near its source, and at more than one point lower down, and also its two tributaries; while its mouth, and the river itself for some 10 miles from its mouth, was the scene of much of our shooting and bird-collecting. Its actual small windings are doubtless very different from anything which appears here. But I believe that later investigation will go to show that the *general* course is, *on the whole*, correct; while that part of it nearest the sea I determined, as carefully as I was able, by estimation of distance and cross-bearings with the prismatic compass from various points, *e.g.* Barakoska Noi, the Pesanka Gora, and the plateau where we had one camp.

Of mountains there are on Kolgueff none that fairly deserve that name. Sowandeyi and Siekherher, the two highest points on Kolgueff (named by the Samoyeds from hills of the same name on the Timenskii Tundra), are, as near as I could estimate them by aneroid, 100 feet high, and at their bases 150 feet above the level of the sea. They are, essentially, great heaps of sand, terminating in peaks and ridges, piled up in a curious confusion of crater-like hollows and gullies worn by melting snow. They were, I believe, the last places where the winter snow remained on Kolgueff; and it had not all melted there when I visited them on August 26. Bolvana Gora, though scarcely so high, is really a remarkable hill in appearance. Thickly covered with grasses, almost completely circular at its base, it rises suddenly from the general level —a conical hill as smoothly and regularly formed as though an old artificial camp. The other mountain, Honorohur of the Samoyeds, is a very conspicuous object from far around, and very characteristic in shape; so that it is called by the Russians Lodka (the boat), for that is the appearance it presents to them when seen from the mouth of the Pugrinoy, where their boats sometimes go.

It will have been gathered, from what I have said, that Kolgueff is essentially a water and ice formed island. In this it differs from any other important island of those seas, Novaya Zemlya being really a disconnected spur of the Urals, and Spitzbergen, as we are told, a survival from a great continent of the Secondary Period. What is Kolgueff's exact relation to the adjacent Tundra, I do not yet feel able confidently to pronounce. Doubtless, like the Tundra, it rests on a granite basis. But of continuous rock there is none which appears in any section. All is either in the nature of alluvial deposit, or of sandstone more or less imperfect, or of isolated blocks of glacier-borne granite. I am inclined at present to regard it as a recent island, elevated from beneath the waves; and I think it probable that my specimens, when more critically examined, will prove this view correct.

The traditions of the Samoyeds themselves and of the Russian traders of the Pechora seem to point to a very old occupation of Kolgueff by these people. There was never a time, so far as I could learn, when the island was not occupied by a *resident* population of Samoyeds. Prior to the year 1860 there were many Samoyeds there, and many reindeer, one merchant alone owning 10,000 of these animals. For in those days there was traffic not only with the Pechora, but between Mezen and Indiga—the nearest towns of the coast—and Kolgueff. Then there came a great reindeer plague, the Mezen and Indiga traders lost their reindeer, and with that all their connection with Kolgueff ceased, and so absolutely that in the short space of thirty years all knowledge of the island has passed out of the minds of these people. That was why, when the Foreign Office most kindly took up the question of our position, nothing whatever could be learnt about it. Only one family—the Samarokoff of Okshen, on the Pechora—retained their old connection with the island, and with them alone remained, so to say, the secret of Kolgueff. These were the men who brought us off.

About the middle of last century (1767), 60 or 70 Raskolniks, men and women, chose this island as their asylum, and settled, it is said, at the mouth of the Gusina, where Saweljew declares he saw traces of their huts. Some accounts say they all died that first winter of scurvy; others, that one or two only survived and abandoned Kolgueff the following year. At the present time there are, all told, 59 Samoyeds here, and they represent nine chooms. The oldest of them is old Yelisei, who says he is seventy, and has been on Kolgueff fifty years.

Of buildings, there is a collection of huts (Isba and Ombara) at Sharok, and also on the Pugrinoy, where also is a very nice little church built many years ago by Alexis, the Russian who owned the 10,000 reindeer, as a set-off to Sibiriakoff's church at Khabarova, on the Yugorski Shar. But of course there is no priest to serve this church. There is also an isolated Ombara on the Gobista owned by Mark Ardeoff, an old Samoyed, and a second in the Pesanka mountains, owned by Uano, who first befriended us.

Before the reading of the paper, the PRESIDENT said: Mr. Trevor-Battye, who is now on my left hand, gave us some anxiety during the autumn; he assures me there was not the slightest cause or reason for it, but our ignorance must be our excuse. Sir Hugh Willoughby told our ancestors that that low land he sighted in the position of Kolgueff was apparently uninhabitable; moreover, it was within the Arctic Circle, and winter was approaching. However, we have got Mr. Trevor-

Battye safe here now, and I hope you will give him a very hearty welcome, for he is about to enlighten our ignorance, and to tell us of a part of Europe previously almost entirely unexplored—a region limited in extent, it is true, as we must expect unexplored regions in Europe to be; but, at all events, the account of it will be new to us, and I feel quite sure he will make it a very interesting one.

After the reading of the paper, the following discussion took place:—

Mr. SEEBOHM: I am sure we have all listened with very great interest to the very graphic account which has been given to us this evening of a place where an Englishman has probably never set foot before. Nearly twenty years ago, in the year 1875, when Mr. Harvie-Brown and I visited the Pechora, on the mainland a little to the east of Kolgueff, we found that, as far as we could ascertain, no Englishman had visited that valley for at least 250 years; so that, although it is in Europe, you must admit that this part of the world is one which has been very little explored by Englishmen. Mr. Trevor-Battye has given us a passing notice of the geese upon the island, but he said very little of the various kinds of birds which breed there. He was very anxious, of course, to find the eggs of the Curlew sandpiper. This little bird is probably better acquainted with the geography of the Arctic regions than any Fellow of the Geographical Society. It is not at all uncommon upon our English coast in winter; it goes down into the Mediterranean; it is found in Central Africa, in various parts of Southern Asia, and even as far as Australia, yet we do not know where it breeds. Harvie-Brown shot one or two at Archangel; I shot one in the valley of the Pechora, and another in the valley of the Yenesei; Middendorff saw a few up to the middle of June in the Taimyr peninsula. Further east Dr. Bunge, a celebrated Russian explorer, found them migrating northwards in very considerable numbers in the delta of the Lena valley, and they disappeared also about the third week in June. He was afterwards on the Liakoff Islands further to the north, and there he observed them until about June 20, when they disappeared. The only inference to be drawn from these facts is that there must exist some places further north than these I have mentioned, which in summer are sufficiently adapted for this little bird to build its nest and to rear its young. This is a very important geographical fact, which we only know from the migration of this little bird. There is one thing Mr. Trevor-Battye has not mentioned to us, and therefore I think we may fairly conclude that he did not observe it—that is, on the island of Kolgueff there is one enormous advantage which the mainland does not possess: the cold winds are sufficient to drive away the mosquitos. I do not know whether he met with mosquitos [Mr. BATTYE: Yes], but it is the one fact on the mainland that impresses itself upon the traveller most strongly. The migration of or variation in the ice is also an extremely interesting point. Harvie-Brown and I left the mouth of the Pechora about August 4, and sailed in a small brigantine, about 120 tons, north of the island of Kolgueff, and did not see the slightest sign of any ice; but this very ship, in trying to force its way into the lagoon of the Pechora through the barrier islands that protect its coast, had to wait several days before it could find a passage through the ice. This points to about the ordinary date when the ice clears away, which, as you will see, is extremely late in the year, and may be variable in different seasons according to the prevailing winds. There is another point to which attention has not been drawn for want of time, and that is, the country, during the period when the ice is breaking up in the spring or when it is beginning to form in the autumn, makes travelling almost impossible. We made the journey from Archangel, went by land and came back by sea, and therefore had the disadvantage of having before us the continual worsening of the road by the melting snow, and in various places we really thought we should have been finally stopped in our progress. Our horses were up to their bellies in the snow, and we had to unharness them, let them plunge out as best they could on to hard ground, and push the sleigh after them. I may say the account given of the Samoyeds—or, if you like, the Russian plural Samoyedi—is extremely interesting. I have seen a very great deal of them, both at Archangel, Mezen, the valley of the Pechora, and the valley of the Yenesei. If you put the time together, I have spent something like six months amongst them, and have been extremely interested in hearing the graphic account of them. One thing Mr. Battye promised to tell us, which he forgot to do, and that is the extraordinary catch of geese which they had, and which, I am sure, must have been an exciting scene. I have seen something of these geese when they are moulting so rapidly, as they are obliged to do in the extremely short season, that they are absolutely unable to fly, and I think, if I am not incorrect in remembering what Mr. Battye said, the Samoyeds, when they had surrounded them, caught something like 3300, which is an enormous catch. I have an extremely vivid recollection of finding these geese precisely in the same condition, and the reason why I remember it so well is because Mr. Harvie-Brown and I, together with some Samoyeds, possessing in all but a dozen cartridges, had to wait for a ship which was to have come to fetch us, but owing to the stormy weather was unable to do so, and if we had not fallen in with these geese I think it very likely indeed that I should not have been addressing you to-night; they were a godsend to us. We were more fortunate in finding sleeping-accommodation, for we dropped upon the wreck of a ship, and fitted up very comfortable sleeping-accommodation, and passed several weeks of very stormy weather in these curious quarters. It is too late for me to go into more detail respecting the Samoyeds; a great deal might be said, not only of their language, but their traditions; also of the many ways in which the reindeer are so extremely useful. I will only conclude by saying how greatly interested I have been in the account we have heard this evening, and which I am sure you have all shared.

Admiral Sir E. OMMANNEY: Having navigated every part of the White Sea in 1854, in the Russian war, in command of the naval force, I will make a few observations, although the conditions of that sea are very different to the Arctic Ocean surrounding the island of Kolgueff. I wish to ask Mr. Trevor-Battye whether the Atlantic Gulf Stream exercises any influence around Kolgueff, also whether any heavy polar ice drifts down to that island. Being war-time when I landed at various places in the White Sea, my visits were generally of a hostile character, which depended very much on the manner of my reception by the natives. As allusion has been made to the attacks from mosquito swarms, I may say we found them very formidable and irritating defenders of their native land. Our only sheltered anchorage was near Cross Island, at the entrance of the White Sea, where we procured fresh water from the rivulet on the mainland. The boats' crews employed in watering returned on board with their features so much swollen by the stings of mosquitos as scarcely to be recognized. Much praise is due to our adventurous yachtsmen, who prosecute the hazards of Arctic discovery. It was a fortunate circumstance which landed our lecturer on this unexplored island, who brought us such important information as a naturalist, also on the geology and geography of Kolgueff. Mr. President, you will agree with me in saying that Kolgueff is the land of plenty as compared with the Arctic region, where we passed eleven months, including the winter of 1850–51, which was comparably destitute of animal life.

Mr. TREVOR-BATTYE: May I say—in thanking Mr. Seebohm for the kind way he has spoken—that no one is more conscious than myself of the extremely inadequate nature of the paper? I am afraid I rather over-calculated the amount of time I should be able to devote to it. Although I have necessarily been obliged this evening to keep very much to geographical details, I of course made, during my stay on Kolgueff, many observations in natural history, and have many notes on the birds. When I have an opportunity of publishing these, I shall hope to describe the big goose-catch to which Mr. Seebohm refers.

The PRESIDENT: Mr. Trevor-Battye has given us a very clear and, I should suppose, exhaustive account of the physical aspects of the flora and fauna, and of the interesting Samoyedi inhabitants of the island of Kolgueff. To students of Arctic history, Kolgueff is a classic name. When Sir Hugh Willoughby undertook his voyage in 1553, and discovered the coast of Novaya Zemlya, he plied to the north for two days, and then south-south-west, until he sighted low land, which I have no doubt was Kolgueff Island. We then read of Stephen Burrough, the future chief pilot of England, passing the shores of Kolgueff Island to his left, when on his way to the strait, now often called the Kara Strait, but which ought to bear the name of its discoverer, Burrough. If I remember rightly, he mentions having seen a great number of curious wooden idols, like those obtained by Mr. Trevor-Battye, and it would be interesting to think that one of the images now brought home was seen by Stephen Burrough, possibly handed down from father to son. Then we read how Arthur Pett and Charles Jackman, in returning from Pett Strait, managed to get their little vessels of 20 and 40 tons respectively on the sand of the southern coast of Kolgueff Island. There are many other incidents in Arctic history connected with this island. I think we should also remember that in his interesting description of these northern shores our great poet Milton mentions the island of Kolgueff. Many memories are connected with it, yet it was only a classic name to us until it was clothed with living interest in the charming paper we have just heard read. I now propose a vote of thanks to Mr. Trevor-Battye, and I feel sure it will be carried by acclamation.

I have an impression in my own mind that Mr. Trevor-Battye has the stuff in him which goes to make a great traveller. I feel sure that if he is spared it will not be many years before he comes back to us, and appears before us in this room after having achieved some other greater geographical piece of work. I shall have that belief in my mind when I convey to him your thanks. I have now great pleasure in thanking Mr. Trevor-Battye, in the name of this meeting, for the very interesting paper he has read to us.

AN ARTISTIC EXPEDITION TO THE NORTH POLE.

By JULIUS v. PAYER.

PAINTERS are asking for new material on which to exercise their art. What can there still be that has remained hidden, as by a miracle, during two thousand years of skilled workmanship? This material must all belong to the earth; is it yet completely explored from an artistic point of view? No. This is only the case with its civilized states; beyond them some great master has now and again ventured a step, not without a misgiving that he has thereby quitted the legitimate sphere of art. And yet how small is the matter for artistic reproduction in the old civilized world compared with the rest of the globe! Has the desert been depicted in such a manner as it undoubtedly deserves to be? Or the Tundra, the primeval forest of the Dark Continent, the swampy shores of Lake Chad, the bridle-path of the Cordilleras, the

Tibetan mountain-lake, or the Coral Islands? What of the animal world, if we except our domestic animals and some wild game—the Indian beasts of prey, the African pachyderms, the troops of monkeys or tortoises of Brazil? And then the scenes of human activity—the negro battles, the dreamy still-life of the South Sea Islanders, the buffalo-hunters, Yakuts so hardened as to sleep almost naked in the snow, indiarubber-collectors on the Amazons, Patagonian giants, Niam-Niam dwarfs, etc. Here is material enough for the twentieth century, which will perhaps bring us discoveries which may facilitate the world's intercourse in a manner still undreamed of.

Whether the aërial ship, for the construction of which so many have striven in vain, will be a *fait accompli* in the coming epoch, is still doubtful; and yet in my opinion it is only by an aërial route that a region can be explored which remains less known and less accessible than any other part of the earth—the North Pole. The few navigators who have penetrated into those regions have been so occupied with the details of ice-navigation, that they have been able to pay no attention to the artistic beauties of the North Pole, surpassing though they be. The impressions which I received there were overpowering, and caused me deep regret that I was unable to reproduce them. The drawings with which I illustrated the account of my voyage, though of some use as an explanation, could give but a remote idea of the phenomena to be depicted. I have, therefore, devoted myself to painting, and have been so fortunate as to achieve some success with my North Polar pictures, "Starvation Cove," the Franklin series, "Never again" (a tribute to the memory of my deceased friend Weyprecht), and others. But even in the execution of these pictures, I experienced an oppressive feeling of insufficiency, of inability to worthily depict the richness of nature in the Polar Regions. The conviction forced itself upon me that this is to be represented in all its variety—known to but few—only by actual inspection.

Long had the erroneous idea prevailed, with regard to the nature of that region, that it was formed of nothing but snow; that, "white, ever white," it formed a frozen plain, over which a grey sky brooded. Whence is this description derived? In the first instance, from the repetition of the Old-World tale of Herodotus, of the horrors of the Scythian winter, and the land of the Anthropophagi, wrapt in a murky snow-filled atmosphere. Of just such a frightful aspect did the Arabs picture to themselves even the south of Siberia; the would-be voyagers to the Indies through the ice heaped up new prejudices; and if these had remained without confirmation, it was supplied by the illustrations of English and American North Polar navigators. Who had manufactured these illustrations? Draughtsmen in London and New York, who had never seen the lands to be depicted, and who, therefore, could but depend on tradition, according to which even the Alps were held to be without beauty, and even hideous. Thus the belief crystallized more and more, that the North Pole was a frightful desert, devoid of every artistic charm, almost of life. Times without number have I encountered the utmost astonishment, even among educated men, when I have unfolded the true picture of the far North.

What I could do by word of mouth with individuals—without thereby shaking the general prepossession—I could only partially accomplish with the paint-brush. I felt my inability to conjure up from fading memories that which I had admired merely as a layman; as a layman, that is, unpractised in analytical methods, which are possible to an adept alone. Never, therefore, did I satisfy my craving to picture the vast, the mysterious, the fantastic, or the tragic (though these still remained fixed in my memory), and I confined myself, without thereby deviating from the truth, to the dull, featureless day, which to be sure is common enough, and was of use for my historical pictures—and the artistic variety of the North vanished meanwhile. Thus even I helped by my pictures to intensify the prevalent notion as to the appearance of the Polar Regions, and not without self-reproach did I hear, as the echo of the impression conveyed, " Well, monotonous and desolate it is up there, even as it is here depicted, nothing but ice and snow."

The artistic consists in change, not in gayness of colouring, and the greatest effect is produced by little colour, even a monotonous view gaining life from charm of light. Yet there is no monotony at the North Pole. I have spent nearly four and a half years in those regions, ever entranced by the change in the picture of nature. What a magic spell, for instance, is produced even by the twilight—that of spring, but especially of autumn; the time without bright light, almost without shade; that of the soft, dreamy silhouettes, of the clear green sky, and the pale silvery tone of the mountains! The snow is now melted, and the blue sea-ice lies bare, scarcely tinged with red by the setting sun. Even the long winter night possesses its artistic charm from the midday arch of light, or the moon which changes the channels beneath into rivers of silver. The arctic sky alone would enrapture the painter. As the returning sun nears the horizon, every colour glows forth, a border of light dividing the part of the atmosphere still in the shadow of the earth from that already lighted up; while the sun's return is accompanied by those refractions of rays and atmospheric reflections, or *Fata morgana*, about which we still know so little.

Before a change of weather, or a storm following on severe cold, the refraction is such that no confidence can be placed on the apparent size or position of any object. Ice-blocks may present the appearance of tall pillars or ruined towns; ships beyond the range of direct vision may appear twice, thrice, or four times repeated, and mountains are seen double or treble their real height, and constantly changing their form. The sun is visible days or even weeks before it actually reaches the horizon, and exhibits remarkable appearances, the most seldom being that in which numerous false suns are grouped round the true sun in the centre, as many as twenty being sometimes seen in concentric circles, all connected by glowing rays with the central point. All these phenomena display prismatic colours in an atmosphere filled with ice-needles and frost-nebulæ. If the temperature sinks to 40°–60° below zero, the red disc of the sun, enormously exaggerated in size, hardly breaks through the vapour; everything appears far off; men are in a moment covered with hoar-frost, and their breath envelops them in clouds of mist, on which their shadow is distinguishable edged with yellow. If a rift opens in the ice, white pillars of frozen vapour arise like a huge fountain, scattering snow-dust around. In the midst of it all prowls the ice-bear, aroused from his winter sleep, a never-resting wanderer.

The sun mounts higher. The snow-fall ceases, and the moisture arising from the sea condenses on the mountains into a covering of ice, tinged by the sun, still low in the sky, with a wonderful orange and rose—an alpine glow lasting for weeks! All is warmth and luxuriance, the exact converse of the autumn twilight. As the temperature passes the zero-point, dusky water-vapour broods everywhere over the icy sea, dark as in a total eclipse of the sun. The snow-covering of the ice-blocks melts, and large cold ice-lakes are formed, traversed by dim phantoms of snow-ridges. It is a good picture of the nether world, often sublime, but at the same time desolate and depressing to the shipwrecked mariners, who drag their sledges, up to the hips in the water of a shallow sea, surrounded by unseen chasms.

The "ice-blink," a refracted light from impenetrable pack-ice, while it gives warning to travellers in search of open water, serves also to enhance the beauty of the scene. When the sun has reached its culminating point, a dazzling clearness of the atmosphere ensues, light fleecy clouds float across the deep blue sky, the sea becomes ultramarine, and above it icebergs rear their heads aloft, sea-birds hovering round in swarms, while their whole mass glows at times in the northern light. Only at the margin of the ice does the restless surf beat, audible even when invisible.

The land, they say, is never free from snow, for so have the illustrations always represented it. But, though the so-called snow-line is said to coincide with the sea-level in the Polar lands, wherever in summer the temperature rises ever so little above the freezing-point, there is no snow covering, however low the mean for the year may be. By April the sugar-like covering of the rocks disappears; in May no more snow lies on the plains; and in June there are extensive pastures, which supply food to herds of reindeer and musk-oxen. Although there is never the thick flora of our meadows, yet one meets with limited areas, either yellow with *Papaver nudicaule* or *Ranunculus*, or carmine with *Silene* or *Saxifraga*, or blue with forget-me-not, or white with *Cerastium*. Owing to the long Polar day, altitude affects the vegetation much less than in Europe, and the mountain slopes, on which the sun's rays fall almost perpendicularly, often show the richest carpet of flowers. It is not so much the cold *per se*, as its long duration, which limits the Arctic flora. As soon as the sun ceases to set, the snow melts as by magic, the plains are converted into bogs, while the hot oppressive air is filled of an evening with swarms of mosquitoes. The greenery imported by the vegetation lasts late into the autumn, the temperature of which far exceeds that of spring.

East Greenland, in particular, is of great beauty. Its huge Kaiser-Franz-Josef Fiord surpasses Norway; and may be compared to the Pennine Alps, supposing the valleys were filled with water. With a greenish landscape on the margin, rocky walls above reaching to over 6000 feet, and mountains behind to 13,000 feet, it forms one of the most majestic scenes in the world, whose beauty I have never seen surpassed. South of Cape Franklin are mountains just like our famous Dolomites. North-east Greenland, too, is an Arctic alpine land; Spitzbergen has a profile like a saw; Novaya Zemlya is a tableland, buttressed by mountain cones; and all these lands enjoy the most delicious invigorating atmosphere, free from miasma and germs of disease.

In this sketch I have not exhausted, but only indicated, the variety of Arctic natural phenomena. I have said nothing of the life added to the picture by the animal world, or the peculiar mode of existence of man in those regions. But enough has been said to support the conclusions I wish to draw.

The above scenes have never been depicted by an artist; nay, we know almost as little of them as if they belonged to the moon. Shall it never be otherwise? Would an exploration by the paint-brush be less glorious than the discovery of new lands? Would not a scheme be worthy of recognition and patronage, which should be devoted to the faithful representation by pictures of an unknown world, serving thereby knowledge and science? Yet this end could never be attained without an expedition sent expressly for the purpose.

Filled for years with the idea of a picturesque exploration of the Polar Regions, I have set myself the task of calling into being *a new North Polar expedition* with artistic objects in view. It is Count Wilczck who, by commissioning me with the execution of a colossal picture of the North Pole, has again, as in 1871, caused my ideas to take a tangible shape. It is planned that such an expedition as I have described shall be sent out by Austria-Hungary.

By far the most tempting objective of such an expedition would be North-east Greenland, the most picturesque region of the North, and by pushing on along the coast of East Greenland towards the Pole, one would reach a region of the greatest contrasts and effects, which increase with the latitude. And as we did not before explore further than the 77th degree, each step beyond would at the same time be a geographical discovery. It is true that for this a great expenditure would be necessary, so that I must also keep before me a less distant goal, and perhaps set on foot a sort of preliminary expedition, the results of which might still be important. No one can recognize the difficulties more clearly than I do myself; but I do not consider them insurmountable, and my previous experience will guard me from entering on the task insufficiently equipped. I have the fullest confidence that this new Austro-Hungarian expedition will take definite shape, even with the ambitious programme which I have suggested.

The plan of the expedition which I propose to lead would be somewhat as follows. A new steamer of 400 tons (200 horse-power) would be built, and manned with Dalmatian seamen, with three qualified officers, besides experts, engineers, Tyrolese marksmen, etc. To carry out the main object, painting, I would take also two landscape-painters, one animal-painter, and a photographer. A central studio would be erected at the winter quarters, and movable glass studios would also be taken for use both on deck during the summer and at special localities. All would be capable of being heated, and of being lighted by electricity supplied by benzine or petroleum motors. A captive balloon might also be used as an aid to study. Studies and pictures would be taken in great numbers. Drawing I have found possible by the hour even at a temperature of 50° below zero, and by moonlight, the northern light, etc., as well as by daylight. Painting is more difficult. When impossible on deck, I used to descend into the cabin after each inspection of the view; but with a suitable studio this would be avoided. An oil which remains liquid at very low temperatures would be used instead of oil-colours. The studies would remain unaltered, but their subjects would be worked up into pictures on the spot while the impression remained fresh. The work would be more difficult, but not impossible, on extended sledge-expeditions. At times one would be limited to putting down the proper colours, while photographs taken at the same time would show their proper arrangements. Hunting and other episodes would naturally be depicted afterwards on board ship. The glass studios would have to be tested beforehand in an exposed situation as regards their power of resisting snow-storms. A large proportion of all the studies would be taken, however, at a temperature above the freezing-point.

The naval officers would carry out the meteorological and magnetic observations, while a naturalist (a doctor at the same time) would collect everywhere. Cape Franklin, at the entrance of the little-explored Kaiser-Franz-Josef Fiord, would recommend itself as the first winter quarters. A mass of rock nearly 6000 feet high is surrounded for miles by a grass-covered undulating country, in which I have seen herds of fifty or even a hundred head of reindeer. The fiord could be explored in summer and, if means allowed, a detached winter station could be erected in the interior in telephonic communication with that of the ship. Nowhere else in the Arctic regions is the chase so productive as at the mouth of this fiord, a bear, reindeer, musk-ox, or walrus, or perhaps all four, being probably met with in the course of a few hours' stroll, and there should be no lack of fresh meat. Besides shooting the game, the Tyrolese marksmen might do good service by ascents of mountain peaks, which help so much to a knowledge of the configuration of the country.

The crossing of the stream of pack-ice in order to reach East Greenland is best accomplished in about 74° N. lat., as was done by Clavering in 1823 and Koldewey in 1869-70. It is true the ice of that stream is the heaviest in the world. There are masses along which one may steam a whole day together, and whose lofty surface cannot be seen from the ship. On whatever coast seals or walruses are found, there Eskimo can live, and though no one but Clavering has seen them in East Greenland, it is quite possible that they may be still settled there.

The cost of the expedition, which is to start in June, 1896, is only in part covered, and it will not be slight. There will be no lack of volunteers, for happily there are always men ready to incur risk to serve a great end. The dangers and hardships are great, and more than a passing enthusiasm is needed to induce men to encounter them—the steadfast purpose of the scientific inquirer, and the irresistible impulse of man to become acquainted with the globe in every direction. My expedition is inspired by this ever-fresh ideal, the same which influenced Holzendorff when he wrote to me respecting "Starvation Cove:" "North Polar voyages are among the most striking manifestations of human civilization."

CRATER-LAKES NORTH OF LAKE NYASA,

WITH A SUGGESTION AS TO THE ORIGIN OF CENTRAL AFRICAN LAKES.

By DR. D. KERR-CROSS.

LAST year (1893), accompanied by my wife, it was my privilege to travel for a month on the hills north of Lake Nyasa, in British and German Central Africa, and to visit some new country, and to see some small volcanic lakes of which I had for long heard. The country to the immediate north of this lake is not only interesting in itself, but it is the border country between the spheres of influence of these two great European Powers.

The Songwe river, which divides the two spheres, is quite an arbitrary division, and runs through the country occupied by *one* great tribe. This tribe is known to the outer world as the *Wa-nkonde*, but by the people it is divided into several families or tribes. With some pronounced differences, they speak one language, and have the same characteristics in customs and dress. Some occupy the plains skirting the lake, others the plateau, while another section is distinctly a hill people, and is found in Wundale and Mesuko. The Wa-nkonde section was that first visited and influenced by Europeans, but we now know that of the five families this is the least influential. The people themselves divide their tribe thus: around Karonga and south of the Songwe river, the *Wa-nkonde;* from the Songwe to the Kinga (Livingstone range) mountains skirting the lake, the *Wa-nyakyusa;* directly to the north between the Kinga and the Wundale Mountains to the west is an extensive amphitheatre occupied by the *Wa-kukwe* people; the Wundale Mountain country is occupied by the *Awa-bundale;* while north of the Songwe river, still in hill country, come the *Wa-mesuko* people. Few travellers have visited the two last-named families of the tribe, as their country is extremely mountainous, but they are a most interesting people, and quite as numerous as any of the other sections.

The Konde country proper is that plain skirting the north of the lake, which is shut in by the steep slopes of the Henga mountains to the west, and the Livingstone (Kinga) mountains to the east. It does not include the mountain country west and north. This plain is in the main a dead flat, and has been laid down by the Nyasa. In the rainy season, great stretches are under water, and it is only habitable in certain localities which rise above the general level. It is, however, very rich, being watered by six large rivers and very many small streams which come from the hill country. A great change is coming over this plain, owing, as the natives say, to the "drying up of the lake." Yet the Nyasa must have occupied its present level for a very long time, as there are found huge báobab (*Adansonia digitata*) and banyan (*Ficus Indica*) trees quite near the edge of the water, and these, according to most authorities, indicate at least the sameness of level for several thousands of years. Still, to all who for some years have lived on the lake shore, there is an obvious fall of between six and ten feet, say, within the last ten years. When I first saw Karonga it was one great banana plantation; now, owing to the decrease in the rainfall, and the fall in the level of the Nyasa, this plant does not grow in anything approaching its former luxuriance.

Having skirted not far from the lake shore the whole of this extensive plain, we began to ascend to the hill country, going through "mwankenjas"—large and lovely villages. The Livingstone range of mountains, as a colossal wall of thousands of feet, towered on our right. Not until we had reached the hills and found it impossible to return, did we ascertain that we had passed two small *volcanic* lakes; and, as we had the pleasure of visiting others of a similar nature, we conclude they are all of one series. The two small lakes are named

Kingire and *Ikapa*. They are said to be about five hundred yards across, and abound in fish and hippopotami.

Half a day's climbing brought us to the country overlooking the Nyasa, and occupied by the Wakukwe people. The country here is called *Nseria*. Here the German missionaries have settled, and begun a noble work. I can only speak of these men in terms of the highest praise. They belong to the Lutheran Church in Berlin, and already have opened four mission stations—one on the lake shore, and three on the hills.

Standing here, about 2500 feet above the lake, you obtain a magnificent view of the Nyasa. The Livingstone range towers in sheer escarpments to the east of us; away to the west, as a dim rugged line, you can descry the Henga mountains, with Mount Waller to the south and west. The Nyasa, far beneath, stretches to the horizon; while the Nkonde plain, distinguished by trees, lies below at our feet. The Lufisa river is here very much larger than we had anticipated. Near to Wangemannshöhe, the Berlin Mission station, it would be 100 feet broad, with a very rocky bed of huge boulders, a very swift current, and no bridge. The missionaries have been cut off from the outer world for weeks, being unable to cross.

In its physical structure the country through which we are now travelling is entirely different from any other in Nyasaland. It is decidedly volcanic. The Livingstone (Kinga) range to the east consists of ancient crystalline rocks—quartzite, hornblende, and magnetite, and, as we now see, it runs north-west by south-east, joining one side of an extensive amphitheatre. On the west is the mountain country of Wundale. These two mighty ranges of mountains close in towards the north, and leave a natural hollow undulating plateau, with its face towards the lake. It is in this amphitheatre that the volcanic lakes of which I have spoken are to be found. The whole country is typically volcanic. There are conical mounds, extinct volcanoes, cinder-beds, streams of basaltic lava, hot springs with sulphur and sodium. The cones are as fresh and as typical as the extinct volcanoes of Central France, near the Puy de Parion. The Kiunguvuvu lies in the bosom of a giant cone to the west of the Lufisa river. Bananas, bamboos, palms, and creepers grow in wild profusion. The vent itself consists of an ironstone. The water was sweet and good, and fish and tadpoles abounded. On one side we saw a little stream or spring trickling into the lake. The lake had no outlet, but inasmuch as several streams rise on the side of the cone, we have indications of underground currents. In diameter it would be about two-thirds of a mile, and the natives say it is very deep. In the early morning, as we stood on the edge of the cone and looked down on the dark circle of water as it mirrored the green foliage of the bananas and the fronds of the palms, we were quite charmed.

Lake Itende we also visited. It is higher up on the summit of another mountain near the Mbaka river. We came on it quite suddenly as we climbed on our way to the Kisiwa, another lake of which we were in search. Not a creature was near, and the oppressive silence was only broken by the shriek of the wild duck. We went down into the basin, and lunched under a giant tree on the edge of the water. Water-lilies of various colours were abundant. Looking south towards the Nyasa, we saw another small crater-lake, the Itamba. It lay like a great circular mirror, set in the midst of dense bush. It is on the east side of the Mbaka river. We had only gone a little way round the hill on which the Itende lies hidden, when we saw another small lake, the Kisiwa. We were in the neighbourhood of volcanic lakes. Before we reached this last, however, we had to make a descent of nearly 1000 feet towards the Mbaka river. We crossed the river, and ascended a lovely wooded country for a couple of miles, when we stood on the shores of the Kisiwa. The word "Kisiwa" in the Ikingonde dialect means a fountain, and often this term is applied to each of the series of lakes; so this beautiful little lake is nameless. It is about a mile in area, and is volcanic; but judging from the cone being less defined, I should say it is vastly older than the others. I find that the Kisiwa is the lake visited by Elton and Cotterill in 1879, and by Mr. Thomson. The last lake of the series was the small crater-lake on the summit of Mount Rungwe, which I also visited.

Two mountain spurs rise from the amphitheatre—the Kieyo and the Rungwe. They are both volcanic. We did not climb the Kieyo, as it looked so cold and uninviting. We spent two nights at the Berlin Mission station on the slopes of this mountain, and so excessive was the cold, we could hardly sleep! The mountain for certain months of the year is shrouded in mist. It has, I am told, the characteristic hollow on its crown, but no lake. It is well wooded.

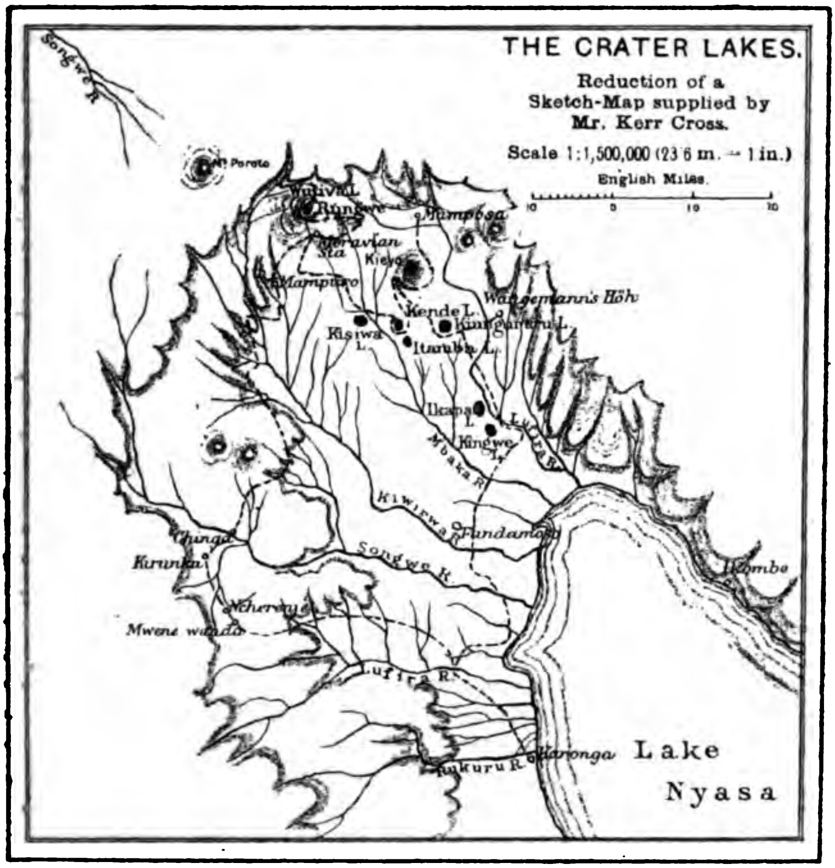
In company with the Rev. Th. Richard, of the Moravian Mission, I climbed the Rungwe mountain. It rises to a height of fully 9000 feet, and is well wooded throughout. At first we trudged on a moorland of bracken and fern, and even moss, with wild thyme in abundance. Compositæ, as the genus Helichrysum and Cynarocephalæ, were found in great numbers at certain altitudes. These latter gave us some annoyance as we scrambled up on hands and knees. The sight of brambles (*Rubus fruticosus*) made us think of days of long ago. The varieties I have met with in Africa are those with white fruit, and not red. Three species of bamboo grow at the north of Nyasa, and it is from one of these—the *Rungwe*, which abounds on the hillside—that the mountain takes its name. After some hours of heavy climbing through undergrowth and thorny thicket, we emerged on a grassy hillside—the grass of which grew markedly in tufts—and looked from a height of 9000 feet over an undulating grass land stretching towards the Nyasa.

Rungwe is a typical volcanic mountain. An enormous mass rises in a cone, or several cones, with hollows, or remains of hollows, on its crown, and gentle slopes stretching away from its side. We found the seventh lake of the series occupying a hollow on its summit. It is two-thirds of a mile in diameter. It contained little water, and the surface lay about 500 yards below the rim of the crater on which we stood. Wild duck swam about freely. Several springs were observable on the sides of the crater; but there was no outlet. A kind of reed, of which the natives make sleeping-mats, grew in abundance. No fish are found, although the water was said to be drinkable. Frequently we were enveloped in mist, and only occasionally did we get a glimpse of the country around and below us. It was bitterly cold—a damp cold. The name of the lake is Wutiva.

Three rivers which run into the Nyasa rise on the slopes of this mountain mass. (1) The Lufisa rises from the north and east, and flows round to the south, receiving innumerable streams from the Kinga mountains. (2) The Kiwirwa rises on the north and west, and flows round to the south, receiving streams from the Wundale mountains. (3) The Mbaka river flows from the south face of the mountain, and receives streams from the plateau itself. Lava-beds are very distinct, as they slope from the mountain summit, and are not much cut up by weathering. Indeed, some of these cannot be mistaken, as they are so marked in their abrupt ending. The molten mass has gradually become more and more consistent and consolidated. Few of the natives have been on this mountain summit, for it is looked upon with awe and dread. Some say that long ago, when they were forced to climb with their cattle during war, they saw the lake, and in the woods heard people speaking and children crying; now the general belief is that a tribe of "heavenly people" resides there.

The soil of this amphitheatre is extremely rich. Speaking generally, it is a dark loam; in some places it is a soft pumice-stone, intermixed with a reddish loam. It is very easily wrought. What tends to its richness is the consistency and regularity of the rain-fall. Scarcely a month in the year passes without rain, and sometimes not a week. The *wet season* here is defined, not by rain falling, but by its coming every day, and coupled with the fact that it is also falling on the plain. From observations taken during several years, rain falls on an average 170 days out of the 365. The barometer stands at 25·000. There are certain places where the rain is excessive, as near the Kieyo mountain. There the natives do not cultivate at the beginning of what is known as the rainy season, *but at its close.*

So much for the *country*. Let me say a word about the people—and what I say refers to the various sections of the tribe. I doubt if *finer villages or better-built houses* exist anywhere in uncivilized Africa than are found among the "Wa-nyakyusa" people. Round houses are occupied by the married people; but they also build *square* houses and long cattle-folds—the "kiwaga." The walls are of bamboo set into the ground at an angle of about 100°. Small bricks—"amapamba"—about the size of an ostrich egg, are fitted neatly, while plastic, into the framework. The whole is a huge basket of bamboo reeds and mud. The reeds on the roof are tied in wavy lines in the form of a dome, and the thatch is laid with great skill. What is more, the house is scrupulously clean! Large villages are uncommon; but on the plains one village adjoins another by banana groves, which often extend for miles. Trees, too, are often their pride, being planted both for utility and ornamentation. They will point out particular giant trees, and assure you that they were planted by their fathers to indicate divisions of the land. There are no stockaded villages, although I have seen a kind of poisonous cactus growing as a defence. Their cultivation,


THE CRATER LAKES.
Reduction of a Sketch-Map supplied by Mr. Kerr Cross.
Scale 1:1,500,000 (23·6 m. = 1 in.)
English Miles.

too, is remarkable. All manual work is done by giant hoes. The fields look as if they had been deeply ploughed, and every furrow is perfectly straight. They are a tall, muscular race. It is a treat, from an anatomical point of view, to see the development of these "men of nature." Head, face, thorax, limbs, are perfect; even their teeth are pearly white, for they are always rubbing them with a soft, fibry wood. They have scarcely got beyond the "fig leaf" stage, and are not likely soon to adopt that civilization which produces a native with a yard of soiled cloth worn round his waist. Their neighbours, the Wa-kinga, are a puny race physically, although they are true mountaineers; and I never saw the adductor muscles of the thigh so well developed as in this otherwise ill-developed people. Every man (Wa-nkonde) seems to be innoculated with the free spirit of independence prevalent among the inhabitants of mountainous districts. Their wants are few, and from strangers it may be said they desire nothing. Cloth they appreciate, but have little idea of its value. They are in what one might call the "Brass-wire Age." This is their gold, or medium of exchange. You can buy anything for brass wire. Iron is found in the Kinga mountains, and is extensively wrought. The ironstone is of a pure whitish variety. They make iron, copper, and brass belts as thick as a man's little finger, and wear them on the waist. Six or more of such belts may be worn on the person of one individual. These are their "manyeta." Their word for riches is "iron"—"ifiera." The Nkonde spears are famed. Though not so large as those of the Masai, their spears and bill-hooks are cruel-looking weapons, with long-shaped barbs. The shafts are made of a dark, hard wood, and are frequently dyed black. They are ornamented, and often beautifully inlaid with a delicate tracery of brass, copper, or iron. They have fifteen varieties of spears, bearing different names. Beyond abundance of brass and copper and iron wire, they go almost nude, while a strip of bark cloth is the modest attire of their women. In their own way they are a hard-working race, but absolutely ignorant of restraint or consistent application. They are kindly, good-natured, courteous, and hospitable; but they are unreliable. Their promises are worthless, and are, of course, freely given. I repeat, their faults are unreliability and utter indifference to outside influence.

Mutilation and other barbarous customs so often practised in Africa, and above all amongst the Wa-wemba (Ba-bemba), are seldom resorted to here. You rarely or never see a man who has lost his eyes, or lips, or hands. Slavery is not in existence in the tribe, not even in its domestic form. Hitherto they have resisted all Arab influence. Only on one occasion, when their great chief, Chungu, died, have I heard of people being buried alive. Despotic chieftains are unknown, and government is invested in the chief and his councillors. Woman is accorded a very high place, and, although she may not rule, she has most of the legal rights of man; and the principal wife, or "mwehe," of the ruling chief, is a personage of considerable influence. Formerly cattle abounded, but eighteen months ago these were nearly swept away by the plague of anthrax, which devastated the African continent in its central portion. We passed through many villages where the long cattle kraal was falling to decay. Elephants, zebras, varieties of deer, are found in certain localities, and at one time enormous herds of buffalo were seen roaming over the plains; but these, like the cattle, have now almost disappeared. The superstitions and beliefs of the people are interesting subjects, but I will only mention two or three, which struck me as peculiar. In various parts of the country, and often on the crests of rounded mounds of considerable size, are to be seen clumps of thick forest. There are their "isyeta," or sacred groves, or burial-places of their ancestors. The undergrowth is so thick that the sun's rays seldom penetrate. In their days of trouble, the "waputi," or priests, resort there to pray to the spirits of their fathers. In these the prophets, "awaraghusi," deliver their messages. No other living creature is allowed to enter. Should war or disease visit the tribe, the "mputi" kills a bull, and offers the blood and the head of the animal. They firmly believe in the spirit of evil; he is "mbasi." In one place Mbasi is a person—an old man—who exercises extraordinary power. He only speaks at night, and to the head-men of the tribe, and during the interview every other voice must be silent, and every light extinguished. In Wundale the people believe in such a person, who has the power to make lions, and who makes use of them as messengers of evil. His home is surrounded with long grass, in which he keeps his lions, as other men keep dogs. If a man has a dispute with his neighbour, who refuses to come to terms, these lions may be hired to destroy his cattle!

I was much struck to find that all over the north end of Lake Nyasa the people regularly perform a *post-mortem* on their dead. Death in war is the only exception. One of the elderly men takes a strip of bamboo, and makes an incision in the abdominal wall below the ribs, and carefully inspects the viscera. They bury immediately outside the door of the house, and in a sitting posture. In Wundale, about a year after the decease and at dead of night, the friends lift the bones and cast them into certain clumps of trees, found all over the country. These groves are full of human bones.

Formerly, the whole of the north of Nyasa was under the despotic rule of Merere, the chief of Usango. For long, however, this tyrant has been gradually losing his power. Every section of the people has its own story of the struggle with the hordes of warriors that came from the north. Now he has entirely lost his influence with the lake people, and confines his raiding excursions to the tribes round Mount Rungwe and the Kieyo. Some twelve years ago his greatest warrior was killed near the lake, and he has never since regained his power. This warrior was believed to be proof against the spear. He was taken captive, however, and dragged before the chief Mwanjewara, when a thousand spears were hurled into his body. As late as September, 1892, 600 of Merere's fighting men came down to the neighbourhood of Rungwe. On their appearance the people fled to the hills, and, with their cattle, took refuge in caves and inaccessible fastnesses. Merere's men followed, when the fugitives hurled stones down the steep slopes, and killed many of the men. This so discouraged the invaders that they left the country. This is Africa!

Leaving this interesting amphitheatre, we travelled due west by south in the mountain country of Wundale. I am right in describing this as a mountain country. It is a continuation of the Henga and Mesuko ranges. Wundale—*ntali* means "high" or "tall"—proper consists of a series of mountain ranges running due north and south, with valleys opening towards the Nyasa. It is 30 miles in breadth and 50 or more in length, and maintains a level of from 5000 to 6000 feet above the sea, with two peaks, Mwasewa and Nyembere, which rise to 8000 feet. The soil differs from that found in the Kinga mountains or the Ukukwe plains we have just crossed. The rock is typical granite, with its felspar of the orthoclase pink variety. The glassy lustre of this potash felspar is very apparent, and the pink colour gives a red tone to the soil and subsoil of the country.

In approaching this mountain country we crossed the Kiwirwa river. This river, as I have already said, rises from the north and west faces of Rungwe, makes a wide sweep, and runs due south, receiving streams from the east face of the Wundale mountains. We crossed this river by a natural bridge of a most interesting nature. The river here runs through a series of wild glens twenty miles in length, and exhibits all the rugged grandeur of mountain scenery. The river itself is nearly 100 feet broad, and plunges through glens and cascades and gorges adorned with tropical vegetation. As we stood near the bridge referred to, we saw two waterfalls within a mile of each other in the course of the river. Two enormous blocks of basaltic rock hurled from the distant hills have fallen across the water, and lean one on the other at an angle of 45°. They thus span the torrent as it sweeps below.

Leaving the Kiwirwa river, we entered Wundale proper, and had two days of very stiff climbing. Cattle were seen everywhere, for the anthrax was less severely felt in these uplands. We climbed until we reached grassy mountainous country 4500 and 5000 feet above the sea. Then we made a sheer descent of fully 1000 feet, to a wild mountain torrent named Kawaka. This stream, the Kawaka, comes from the north, and runs into the Suwiswi river, which joins the Kiwirwa. Even in the dry season these streams convey a considerable volume of water. The descent to the Kawaka was one of the steepest I have ever made. We had at times to steady ourselves lest we should fall forward. The Suwiswi is a broad river, and comes through the wildest of glens. We crossed it by a rickety native bridge made of bamboo. Leaving the bridge, we climbed for three hours, and emerged on a grassy height 7400 feet above the sea. Here we had another magnificent view of the Nyasa. The waves breaking on the shore were distinctly visible. To the east was the Livingstone (Kinga) range, stretching as far as the eye could reach. At two separate levels, one above the other, were long lines of white cloud—dead-level, double table-covers. Directly east we discerned Mounts Kieyo and Rungwe, but both summits were shrouded in mist. The Ukukwe plain, 4000 feet above the sea, seemed an undulating flat. Wundale is wonderfully well watered. Springs seemed to bubble forth from every hillside. In one of the larger valleys I counted thirteen sub-valleys, each with its little rivulet running to the parent stream. The houses are built on terraces dug out of the hillside, and hidden in banana groves. These latter, with their green foliage, contrast strikingly with the red soil. The people are highlanders, wild and independent, but have all the characteristics in dress and customs of the other sections of their tribe. The news of a stranger being in the valley is spread with marvellous rapidity. In a few minutes every cow is called—for the cattle are taught to follow the herd on his making a peculiar labial sound—to the deep foliage of the sub-valleys, or driven to inaccessible heights. It may be that the natives have never before seen a white man, and still less a white lady, but they look upon the caravan with the utmost *sang-froid.*

Crossing this interesting mountain country, with its deep-red soil, shy people, cattle, bananas, rain, and evergreen hills—for there are no bush fires, so characteristic of African life, up here—we descend towards the Songwe river, as it winds its way through this world of mountains, and have again reached the dividing-line or boundary between the two European spheres of influence. Here we enter upon an entirely different soil and people and mode of life. The clay is light yellow and less rich; the vegetable is much less luxuriant and tropical. Bananas will not grow, the villages are stockaded, and the whole country is poorer and not so well watered. We are now on the Nyasa-Tanganyika plateau, traversed by the Stevenson road. This plateau has been described so often, that I do not feel justified in making a single remark beyond the following. *En route* we passed a stockaded village named Kinunka, which means, in the dialect of the place, "an unpleasant odour." Near it there is a fountain 150 feet in diameter, covered with sodium and magnesium salts. Sulphuretted hydrogen is also generated, giving rise to the name of the place. On our way home we left the usual road about six miles beyond Mwenewanda's village, and skirted the Mesuko country. This latter is really another Wundale, south of the Songwe river. It is even more mountainous, but the soil is poorer. On our way south we crossed quite a number of small streams not marked before, all of which ran to the Lufisa river.

Two facts observable on this journey set us speculating as to what could be the origin of the Nyasa and of the series of lakes—some fresh, some brackish, some salt—found in the centre of the African continent: (1) the seven crater-lakes we had now visited; (2) the fact that we had traversed the water-parting of the whole continent of Central Africa.

Within a very few miles you see the head waters of the Shiré river; of the Loangwa valley; of the Chambezi flowing into the Congo and the Atlantic; of streams running to Lake Rukwa, and not far off tiny streams which eventually find their way to the Indian Ocean.

The formation of large lakes in the centre of continents at different altitudes and of great depth is a problem of great difficulty. The "inland seas" in the centre of Africa are no exception to this rule. Africa is one of the oldest of the continents, and has seen marvellous changes from a geological point of view. The hills and valleys, the strata of sand and clay, marl and chalk, and even coal, found where they are least expected, point to extraordinary upheavals in past time. Hill and valley seem to have changed places; great rents to have opened up and swallowed whole countries, and it may be mountain ranges, leaving behind indescribable chaos.

As we reflect on their possible origin, let us recollect a few facts.

1. East Africa is a country of table-lands.

2. Its lakes, Tanganyika, Nyasa, Rukwa, Bangweolo, Mwero, and to some extent those further north—not to speak of the lesser lakes—run more or less in the lie of the continent north and south, and are separated from the sea to the east by highland, and are environed by great mountain systems remote from those of the coast range.

3. The lakes are all at high elevation.

4. Some of the lakes have evidence of great volcanic activity having taken place in late geological time. We have recently extinct craters; we have hot springs and lava flows.

5. There is a decided parallelism between the lakes and the strike of the mountains, and they occupy vast valleys surrounded by high ground or table-land.

6. The mountains consist chiefly of crystalline and schistose rocks and gneiss.

7. The number of the lakes in the centre of the continent is great; and some are salt, some brackish with sodium and magnesium salts, and some are fresh.

8. Most of them have islands.

9. Some are surrounded by markedly escarped hills, with terraces rising from them. Some of these terraces denote a former higher level.

10. In some places the lakes are said to be extremely deep. Notably on Lake Nyasa we have great variations of depth. At the south end

soundings have been made to the depth of 200 fathoms, and no bottom found. At the north and west of this lake the shore is extremely shallow, with sandy spits due to the *débris* brought down for ages by the six large rivers, while on the north-east, under the Livingstone range, soundings have been made to a very great depth without reaching a bottom. Last year, when soundings were taken at Rumbira bay, they had evidences of great heat at a considerable depth below the level of the lake.

As far as I know, no geological sections have been made of the rocks surrounding the Central African lakes, but the biological question has been partially discussed, and the specimens found are said to bear a marked resemblance to marine forms. Lately, the modifications which marine invertebrate and vertebrate forms of life undergo in their adaptation to a fresh-water life have received a great deal of attention. It is hard to believe that these lakes are of glacial origin, and that the sea did not erode them. Glaciers and ice-sheets leave their records on rocks so distinct that they cannot be mistaken. Have we any evidences of transport? any glacial *débris?* any signs of striation? Have any of the rocks left behind the smooth rounded bosses (*roches moutonnées*)? Some deny the possibility of lake erosion by stones carried on ice, or by the glacial stream. In some of the lakes there is no possibility of migration of life. If they had a glacial origin, then the fish, mollusca, and crustacea must have been introduced subsequently, for a fauna or flora could not live during the formation of a lake by glacial erosion. From what we know of the fauna, they point to another origin. The dried-up and retreating lakes all over the centre of Africa, the terraces found on some, denote a former vast extension of these lakes; the great depths said to exist make it hard to resist the evidence that these great inland waters, despite their differences of altitude (and they do differ in this respect), were once part of the sea. The fauna and flora were introduced when the aspect of nature was very different from what it is at the present moment. The sea itself could not excavate such lakes; its power of erosion is limited to a few fathoms of depth. We conclude, therefore, that the terrestrial conditions preceded the marine. These lakes were, in the first instance, arms of the sea, as the Red Sea is at the present moment. The whole continent participated in the general movements of the later Tertiary ages, such as crushing, subsidence, faulting, and upheaval, which are evident on every hand. The fauna living on during these successive convulsions gradually adapted itself to its varying environment. We know that vast upheavals and depressions have taken place to the north and east of the African continent. The Sea of Galilee is 380 feet, and the Dead Sea 1390 feet, below the Mediterranean. Here we might have had another inland sea. What is more, I understand that Nile fish have been recognized by Dr. Gunther in the Sea of Galilee. It may yet be proved that the whole of the centre of Africa was at one time a vast sea. Mountain ranges have emerged, producing great inland lakes, some of which have become land-locked, some salt, and some, after long periods of time, have been effaced. These great convulsions in nature may have produced this remarkable series of Central African lakes, while volcanic undermining, such as is evident at the extreme north of Lake Nyasa, has added its quotum.

DR. DONALDSON SMITH'S EXPEDITION TO SOMALILAND.*

[The following communication, dated "Webi Shebeli, December 14, 1894," has been received from Dr. Donaldson Smith:—]

After leaving the Webi Shebeli, we made friends with the Arusa Gallas at once. They were not the warlike people I had expected. On the contrary, they would not believe we had crossed the river where it was so difficult, but insisted that we had come from the clouds to rid them of their conquerors, the Abyssinians. We were passed on from village to village with the greatest show of good will imaginable. There was much talk in the country about Sheikh Husein, as a place of great importance. There was a large sprinkling of Mohamedans among the Gallas, and by these Sheikh Husein was regarded as a holy city. I determined to visit this village, and go thence to Lake Dumble (incorrectly marked "Demble" on the maps).

For the first 50 miles west of the river the country presented a very dry and unproductive appearance, resembling most parts of Somaliland. We were obliged to thread our way among the mimosa bushes and acacias with the greatest difficulty, cutting a path most of the way. We ascended rapidly from the Webi Shebeli, and when we reached the wells of Gorgora there was a great change in the climate and vegetation. Cool moist air, and an infinite variety of trees, bushes, and vines. We now commenced to have plenty of rain. Threading our way along the edge of a much-broken plateau for many marches, we reached the village of Luku, elevation 5200 feet, on September 17, 1894. To the north of our line of march there was a mountain range running nearly east and west, while to the south was a great expanse of low-lying bushy country, with here and there a single mountain peak visible.

At Luku we found a tomb of one of the former Mohamedan sheikhs called Abai Azied, which was made of stone in the form of a dome, 20 feet high, resting on a huge stone base. Crowds of natives followed us all the way to Sheikh Husein, and did much to assist us in clearing a path for the camels. I was struck by the richness of the soil, and the splendid crops of durrha, maize, and other cereals raised by the natives. The country between Luku and Sheikh Husein was by far the best-cultivated land I saw on my journey, although the whole of the soil in this mountainous district would delight the heart of an English farmer.

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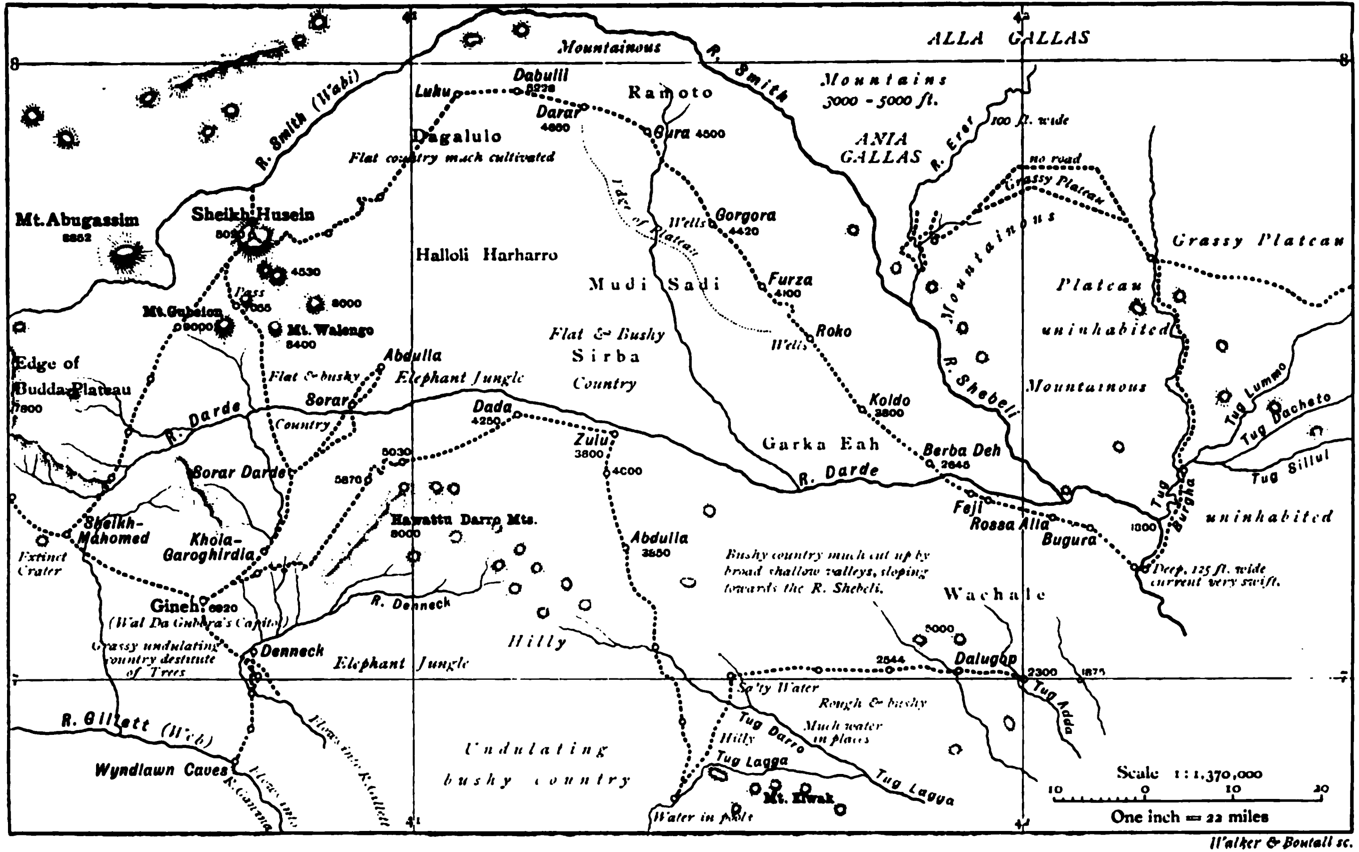
* Compare paper and map, vol. iv. of *Journal*, p. 528.

Dr. A. Donaldson Smith's Route in Western Somali Land.



Walker & Boutall sc.

We passed very many deserted villages, however, even close to Sheikh Husein. It was a very rough mountainous path that led from Luku to Sheikh Husein, and my poor camels suffered severely. There is scarcely a camel to be seen in these highlands, as they are not good pack-animals for rough roads, donkeys being used for this purpose.

We reached Sheikh Husein on September 21, and here my caravan was destined to remain for a very long time. I was much surprised at the stone buildings I saw here. There were five shining white tombs of sheikhs, two stone mosques, and many dilapidated stone buildings scattered over the hill. The hill on which the village is situated is 3 miles in diameter at its base, is only 300 feet above the surrounding country, and has a flat top, on which the village is built. Only 6 miles to the south is a splendid group of mountains, from 6000 to 8000 feet high, to the highest one of which the name of Gubeion is given. To the left is a most striking mountain, somewhat isolated from the rest. This is Abugassim, and is a great landmark. Very near to Sheikh Husein, the river which forms the principal source of the Webi Shebeli, and which I shall call after myself, winds south as it passes in front of Mount Abougassim. It flows north-east, and finally south-east into the Shebeli river. I found another stream emptying into the Shebeli just below this, which I traced to its source. It is called the Darde, and never dries up, according to native report. It rises, as do most of the streams in this part of Africa, from the mountains surrounding this great grassy plateau called the Budda, the eastern end of which I reached as shown on my map.

I had a good opportunity to make a thorough survey of this country, and to do a great deal of collecting. The woods were full of beautiful birds and butterflies and flowering plants. The thermometer at Sheikh Husein averaged 73°, while on the highest plateaus it averaged 62° for twenty-four hours. My Somali boys suffered severely from the cold and the rain, which fell in torrents for a short time every day or night.

I will cut my story short, merely stating that the Abyssinians would not let me advance. They twice stopped us with an army at Emperor Menelek's order, and I have been compelled to return to the Webi Shebeli. Mr. Gillett and I made a rich discovery in the way of a subterranean passage. A large tributary of the Jub river had carved its way through a hill for one mile, as it curved south-east through a deep canyon. This stream is called the "Web," and the river Smith is called the "Wabi" by the natives; but the names are often confused, so I have named the "Web" river Gillett, and the caves I have marked on my map as the caves of Wyndlawn.

On the north side we could only penetrate a little over 100 yards, as the hill had fallen in on one side of the stream. The stream was too deep for us to cross, but I could see high chambers continuing indefinitely into the darkness on the other side. On the south side we went a long way into the heart of the mountain, the vaulted roofs overhead being over 30 feet high.

Not far from these caves is a splendid rugged mountain range called the Darro and Howattu mountains. The country between these and the Webi Shebeli is very broken and rough. On my journey north this had appeared to be a very evenly inclined plain, rising gradually towards the west. In traversing this on my return to the Webi Shebeli, I found it to be cut up into broad valleys not over 500 feet deep. The hills are flat-topped and of a uniform height, giving the appearance to the country of its having been broken up by glacial action, the course of the valleys taking in general a south-easterly direction. Deep rifts and many dry beds of streams, as well as great heaps of loose stones, make rapid travelling an impossibility. The soil is a very light clay, and contains much salt. In two of these tugs we found water in pools, and a tiny variety of perch, which shows the water does not dry up. I am quite satisfied that there is a far greater rainfall as one progresses north-west from Somaliland.

We are all very well, although much disappointed at having to retrace our steps. However, I have no doubt that, by crossing the Webi Shebeli far south, and making a hard push, we shall avoid the Abyssinians until we get among the Borans, who are their enemies still. They would have to deal with an unconquered people before they reached us in this case. Emperor Menelek claims the whole country as far south as the sea!

I enclose a map of the country as far as I have gone. Mr. Gillett, Dodson, and I are in excellent health. I have no doubt that we shall finally reach Lake Rudolf, although it will take a long time to do so. I am obliged to make long, tedious stops to allow the camels to pick up, as they suffered much in the mountains.

THE DEVELOPMENT OF CERTAIN ENGLISH RIVERS.

By WILLIAM MORRIS DAVIS, Professor of Physical Geography, Harvard University.

Thesis.—The rivers of Eastern England have been developed in their present courses by the spontaneous growth of drainage lines on an original gently inclined plain, composed of sedimentary strata of varying resistance. In the course of this development, the land has been at least once worn down to a lowland of faint relief, and afterwards broadly uplifted, thus opening a second cycle of denudation, and reviving the rivers to new activities; and in the second cycle of denudation, the adjustment of streams to structures has been carried to a higher degree of perfection than it could have reached in the first cycle.

Outline.—1. Introduction. 2. Division of region. 3. Statement of the case. 4. General geological history of region. 5. Deductive scheme of river development.

6. The growth of subsequent streams. 7. Diagrams of river adjustments. 8. Conditions determining river adjustments. 9. Consequences of uplift of land-area. 10. Necessity of explicit statement of theory. 11. Evidence of uplift of land-area. 12. Marine or subaërial denudation. 13. Criteria for discrimination. 14. Subordinate conditions. 15. Consequences of theory confronted by facts. 16. The rivers of Eastern England. 17. Conclusion.

1. After much study of English maps and writings at home, I have been tempted to entertain certain theories regarding the development of English rivers, and to announce them in recent years to my college classes; but realizing the danger of theorizing at a distance, a part of the last summer has been given to an excursion over the ground, so as to test the theories by examination of the country and by conference with English students of the question. The experience has been most enjoyable, and in the hope of securing comment and discussion on a subject of so much interest in physical geography, the following statement of the problem and its results is submitted to those who may examine the question more deliberately.

2. Broadly speaking, England may be divided by the irregular lowland belt of New Red Sandstone into a region of older structures and more complicated forms on the west, and a region of younger structure and more simple forms on the east. The western region has three centres with various dependencies, all worthy of finer subdivision: the Lake District, with the great stretch of Carboniferous beds from Northumberland to Derbyshire; Wales, with the small isolated midland Carboniferous districts; and Cornwall. The eastern region, characterized by the escarpments of the Oölite and Chalk, with their uplands and dip slopes and Tertiary margins, is divided by the transverse depressions of the Humber and the Wash north of the London basin, and somewhat complicated by the uplift of the Weald in the south-east.

3. The rivers of the newer eastern region, and of the intermediate lowland, as well as some of the streams of the older western region, present certain geographical features of systematic arrangement that seem capable of explanation, because their arrangement falls into so close accord with the expectations concerning river growth that are deducible from the geological history of the region. In short, the rivers of to-day, in the mature stage of the present cycle of denudation, appear to be the revived and matured successors of a well-adjusted system of consequent and subsequent drainage inherited from an earlier and far-advanced cycle of denudation. Perhaps the best way of explaining what is meant by this condensed statement will be first to follow through an ideal but reasonable and pertinent system of river development, and afterwards to match its deductions with the facts presented by the existing rivers.

4. Imagine a well-varied mountainous region gradually wasting away by denudation, and as gradually sinking beneath the sea. Its windward

slopes will be well washed by sufficient rains; its leeward slopes will be drier, and, if the height of the mountains is great enough, the lowlands at the leeward base may possess saline lakes, around and within which the waste from the mountains will be deposited, with the remains of land animals and plants, or with forms representing fresh or brackish water. As the depression of the region continues, the mountains lose their former height both by wearing down and by sinking; the Piedmont lowlands may be submerged, and marine sediments will then bury the subaërial and lacustrine deposits, and encroach upon the fading mountains. The ridges will stand out as capes and promontories; the valleys will be drowned into estuaries or fiords; the streams will be shortened by the submergence of their lower courses, and often enough what was at first a single river-tree with many branches is now converted into several smaller independent rivers by the loss of the trunk stream in the drowned valley. Having frequently to speak of such dissevered rivers, which are very common in many parts of the world, I have fallen into the habit of calling them "betrunked;" the term being analogous to "beheaded," the two terms serving very well to suggest the opposite processes by which rivers are often affected.

The strata deposited during the submergence of the region will diminish in thickness off shore, and an increasing proportion of calcareous material may be expected as the neighbouring land-area decreases. The once lofty mountain summits, now worn down to a tolerably accordant height as the sea rises, may finally be quite submerged. Although the mountain range may have been denuded by thousands of feet during this long chapter of earth-history, and although the sediments furnished by so great a denudation may have accumulated to a thickness of thousands of feet in the encroaching sea, yet the littoral sea may not have been at most more than a hundred fathoms deep during the whole process; deposition may have so nearly balanced depression that shallow water was maintained during the whole period. Indeed, by introducing such episodes as halts in the depression, or even slight movements of elevation; by admitting climatic variations from dry to wet, from warm to cool, all manner of natural complications may be introduced in the series of strata by which the old mountains are finally buried.

5. Now reverse the process. Let gradual and intermittent elevation replace depression. Let the greater elevation be in the region of the old mountains. As the sea-bottom rises to form a new land, it will take the shape of a gently sloping plain. Streams will gather, guided by the slight inequalities of the constructional surface, and run down its faint incline to the sea, their length increasing as the shore recedes. If the uplift is uneven, with domes and troughs, the streams will assume an appropriate arrangement, in accordance with the special directions of the dip slopes. If certain residual summits of the old mountains were not completely drowned and buried at the time of greatest depression, the

short betrunked streams that ran from them will be the initial head-waters of the new drainage system on the rising coastal plain; but many entirely new streams will be formed on intermediate parts of the plain. The latter may be called simple consequent streams. The former will be old streams in their upper courses, surviving on the mountain heads from the former cycle of history, and now extended by the mouthward addition of consequent lower courses. Various independent old betrunked head-waters may in this way be engrafted on a single new consequent trunk stream. In describing existing river systems, it is certainly desirable to bear in mind the changes of this kind that the past may have played in bringing forth the present. The term "consequent" was introduced by Powell; "extended" has been used by Tarr in the sense here adopted.

Let there now be conceived a pause in the process of elevation after the uplift has reached a measure of 2000 or 3000 feet, and after the growing plain has attained a breadth of 100 or 200 miles. The consequent streams proceed to entrench themselves in the slanting plain, and in a geologically brief period, while they are yet young, they will cut their valleys down so close to baselevel that they cannot for the time being cut them any deeper; that is, the streams will, of their own accord, reduce their valley lines to such a grade that their capacity to do work shall be just equal to the work they have to do. When this condition is reached, the streams may be described as having attained a "profile of equilibrium;" or, more briefly, they may be said to be *graded.* It may be noted, in passing, that inasmuch as the work that a stream has to do is constantly varying, it must as constantly seek to assume new adjustments of grade. In the normal course of river events, undisturbed by outside interference, the change in the work is so slow that the desired adjustment of capacity to work is continually maintained. It may be that during the adolescence of river life, the work to be done is on the increase, on account of the increasingly rapid delivery of land-waste from the slopes of the growing valley branches; and in this case, part of the increase of waste must be laid down in the valley trough so as to steepen the grade, and thus enable the stream to gain capacity to carry the rest. Such a stream may be said to aggrade its valley, adopting a good term suggested by Salisbury; and in this way certain flood-plains (but by no means all flood plains) may have originated. Aggrading of the valley line may often characterize the adolescence of a river's life; but later on, through maturity and old age, the work to be done decreases, and degrading is begun again, this time not to be interrupted. The longer the river works, the fainter is the grade that it adopts.

6. While the original consequent streams are thus at work cutting down, aggrading, and degrading their valley lines, lateral branches will be developed by headward erosion in greater or less number. In regions of tilted structure, with alternations of distinctly harder and softer

strata, the lateral branches will be developed along the strike of the softer masses; and inasmuch as such streams can be developed only after opportunity is offered to them by the deepening of the original consequent valleys, it seems appropriate to call them subsequent streams; the term "subsequent" having been used by Jukes in his important essay on certain valleys in the south of Ireland (*Quart. Jour. Geol. Soc.*, xviii., 1862), essentially in the meaning here given, although not as a technical term. The peculiarity of subsequent streams is, therefore, that they run along the strike of weak strata; while consequent streams run down the dip, crossing harder and softer strata alike. The stronger the dip, and the more marked the contrasts of harder and softer strata, the better the definition of the subsequent streams. Professor Green clearly recognizes streams of this kind, and gives examples and illustrations of them in his 'Geology' (pp. 425, 426), but he conceives them as beginning on a plain of marine denudation, not on the side of a consequent valley in an original constructional land surface. He calls them "longitudinal," thus not separating them from many longitudinal consequent streams, such as are found in the synclinal troughs of the Jura, or of which the Kennett-Thames may be taken as an example. He does not mention their relation to adjustments, considered below, and he seems to regard them as of exceptional or peculiar occurrence, for he refers to the subsequent streams of southern Ireland as "erratic" (p. 428), and calls the longitudinal and transverse drainage systems of the Oxford and the Weald districts "anomalous" (p. 429). It seems to me, on the contrary, that the drainage of these districts is singularly normal and systematic, as will be further shown below. Ramsay, Greenwood, Foster, Topley, Whitaker, and others, also explain examples of subsequent streams in various localities, but I believe in all cases they assume that a beginning was made on a plain of marine erosion, and the generality of the process by which subsequent streams are developed is hardly recognized.

In the case of the new coastal plain, imagined above, let it be supposed that the dip of the uplifted strata and the variations in their resistance is sufficient to give a fairly distinct guidance to the growth of subsequent branches of the consequent streams. A most interesting result follows from this supposition. The larger consequent streams will deepen their channels more quickly and to a lower grade than the smaller consequent streams. The lateral subsequent branches of the larger consequent streams will grow headward along the strike of the guiding weak strata more rapidly than the corresponding branches of the smaller consequent streams, and as a result the upper courses of the smaller consequent streams will be abstracted or diverted by the victorious subsequent streams, leaving the lower courses beheaded. Thus of all the original consequent streams, the smaller ones are naturally selected to be broken into two parts: an upper part, which is diverted by a subsequent stream into a larger consequent stream; and a lower part, which pursues its way alone to the sea. In this there arises a mature adjustment of streams to structures that is of great significance in river history.

7. Figs. 1 and 2 will, perhaps, make the scheme of adjustment more apparent. The straight consequent streams, *a* to *i* (Fig. 1), follow the direct courses suggested by the constructional surface, and flow immediately to the constructional shore-line. They differ in volume, *c* being the largest, and *h* the next, while *f* is the smallest. All of them go to work at once, cutting down their channels to the grade adapted to their volume and their load, and sending out subsequent branches wherever the faster wasting of softer strata on the valley slopes may determine, and at the same time the slowly retreating edges of the more resistent strata take the form of inland-facing escarpments, of which more is said below. Stream *a* is tapped in its upper course by *m'*, a subsequent branch of *b*; the upper part of *a* is then diverted to swell the volume of *b*, while the lower beheaded part of *a* is reduced correspondingly. A pretty consequence of this change may sometimes be seen in the obstruction of the beheaded stream by the waste brought down by rivulets on its valley slopes; such being essentially the case of the lakes of the Engadine, at the head of the river Inn, as described by Heim. Moreover, for a short time after the capture is made, the diverted and diverting streams will flow in a local gorge, just above and below the "elbow of capture," as might be illustrated by special examples. In the same way, the upper part of *b* is tapped by *n'*; *e* is divided into three parts, being tapped by *m''* and *n''*. It is manifest, that of the three captures

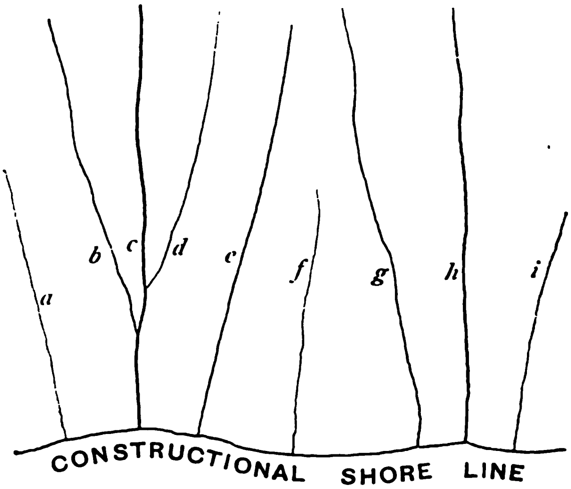


FIG. 1.

made by *n''*, the first was *d*, and the last was *g*. At a still later time, even the head of *h* may be diverted by the further extension of *n''*. The mature arrangement of the streams, therefore, differs systematically from their arrangement when only their initial consequent courses existed, and any region which offers an example of so specialized a drainage system may be accepted as one of the most trustworthy witnesses to the theory of the uniformity of geological processes. No cataclysmic struggles could account for so particular a relation between internal structure and superficial drainage, as must necessarily result from the patient processes of inorganic natural selection here outlined.

Mr. Jukes-Brown has, of all English writers known to me, made the most explicit reference to the spontaneous rearrangement of river courses by the process here described ("On the Relative Ages of Certain River Valleys in Lincolnshire," *Quart. Jour. Geol. Soc.*, 1883, pp. 596–610); but he, like the other writers already referred to, assumes a plain of marine denudation as the beginning of the river history. His recognition of the general applicability of adjustments to explain river courses will appear from the following extract: "I believe that the principles above enunciated and exemplified will explain the courses of certain other English rivers, and purpose recurring to the subject in a future paper" (p. 610). So far as I know, the future paper here referred to has not yet been prepared.

Mr. Cadell has described certain valleys in the southern part of the Highlands of Scotland as rearranged by the spontaneous action of the streams themselves (*Scot. Geog. Mag.*, ii., 1886, pp. 337–347); but he ascribes the changes to the action of the rivers from up-stream downwards, and this does not seem admissible. All such changes are caused, not by the downward action of the stream that is to be diverted, but by the headward or backward action of some other stream, which for some reason has an advantage over the first. The change is always passive so far as the changed stream is concerned. Messrs. Foster and Topley at a much earlier date approached the subject of adjustments in their essay "On the Superficial Deposits of the Valley of the Medway" (*Quart. Jour. Geol. Soc.*, 1865, pp. 443–474), but the systematic relations of the various parts of an adjusted drainage system were not then fully worked out. It is chiefly from the writings of Gilbert, Heim, Löwl, and Philippson that I have gained the ideas here presented.

8. The degree of adjustment of mature streams varies with many determining conditions. Those which favour a high degree of adjustment are: 1. Considerable diversity in the size of the initial consequent streams; the old-land streams that are extended across the new coastal plain by the addition of consequent lower courses generally having an advantage on this account. 2. Considerable altitude of the land-mass exposed to erosion, thus allowing the larger consequent streams to cut valleys of a significantly greater depth during their adolescence than is

allowed to the smaller consequent streams. 3. Considerable diversity of resistance in the strata that are cut through by the streams; a very resistant stratum serving to increase the contrast of depth in the adolescent valleys of the larger and smaller streams, and a very weak stratum beneath the resistant stratum serving to guide the rapid headward growth of subsequent branch streams. 4. A significant amount of inclination in the strata, so as to give distinct guidance to the growth of the subsequent branches. When all these variable elements conspire to favour an adjustment of streams to structures, the systematic arrangement of land features becomes very striking during the mature stage of river life. The denuded and retreating margin of each resistant stratum takes the form of an inland facing escarpment: its dip-slope towards the shore is more or less stripped of any weaker strata that may have originally covered it; its escarpment face sheds short, back-flowing streams into the longitudinal subsequent valley that has been developed along the weak underlying stratum: and, even at the risk of multiplying terms unduly, I would suggest that these streams be called *obsequent*,* as their direction is opposed to that of the initial consequent streams. Several of them are indicated by the letter *o* in Fig. 2. In cases of recent capture, obsequent streams are wanting, as at the elbow where g''' turns into n''; in cases of more remote capture, the obsequent streams acquire all the drainage on the inland slope of the retreating escarpment. The crest of the escarpment turns inland and reaches greater height about midway between the consequent streams, but curves seaward and

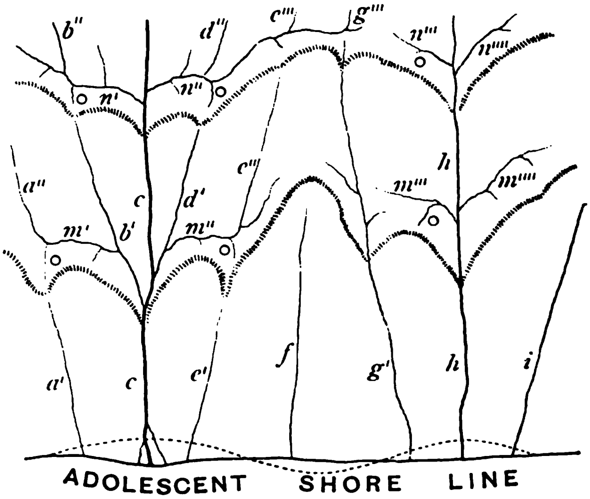


FIG. 2.

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* In earlier writings, I have used the term "inverted" for streams of this kind; but, as its meaning is equivocal, it should be abandoned.

loses height on approaching the transverse valleys that are kept open by the successful consequent streams. The notches in the escarpment, cut by unsuccessful consequent streams before their upper part was diverted, are of varying depth; generally being least perceptible nearest the largest successful or persistent consequent streams, for here the diversion was early accomplished, and most perceptible farthest from the persistent streams, for there the diversion was longest delayed and the notch was cut deepest before it was abandoned.

When the uplifted coastal plain contains more than one resistant stratum, there will be a corresponding increase in the number of inland facing escarpments, of longitudinal subsequent streams, and of adjustments, until a most beautiful complication is attained. The arrangement of the various parts will be remarkably systematic, hence when an explorer sees what seems to be any one of these parts, he should always look for its associated fellows, and in accordance with the perfection of their display he may easily and briefly describe the geographical features of the region that he traverses.

The best examples of the adjustment of streams to structures will be found in and shortly after that stage of the development of a region when its relief is strongest and most varied; that is, during maturity and advancing older age. But as time passes on, and even the harder rocks are worn down lower and lower, the streams meander somewhat freely from side to side, and depart to a greater or less degree from the close adjustments of maturity; yet we may seldom expect to find a region worn down so low in its extreme old age, that the streams shall have lost all traces of the adjustments that they must have once possessed. It is truly possible to imagine a plain of denudation so well completed that it has lost all perceptible relief; but in actual geographical experience, no such plains are discovered. Some residual relief occurs in all known examples of this kind, and, in order to emphasize this general truth, it seems to me advisable to call such almost-denuded surfaces, *peneplains*. The river systems of peneplains are in the condition of fading adjustment. A significant peculiarity of relief in a peneplain produced by the far-advanced denudation of a coastal region such as has been described above, is found in the increasing straightness of its fading escarpments.

9. Now, if it is not too fatiguing to pursue deductive considerations still further, let a second cycle of erosion be introduced by a new uplift of the peneplain that was produced in the first cycle. Thereupon a new strip of coastal plain will be added on the seaward margin of the peneplain; the old rivers of the first cycle will be extended across the new plain to the new shore; and (unless the slope of the new plain is less than the grade of the extended rivers, which is very unlikely) all the old rivers will be revived into new activity. From wandering idly on the old low peneplain, they will at once proceed to incise the newly uplifted peneplain. But in two significant respects, the features of the second cycle

differ from those of the first. In the first place, at the beginning of the initial cycle there were no subsequent streams; all the drainage was consequent. At the beginning of the second cycle, a considerable share of the drainage may be along revived subsequent streams; and with this opportunity so early afforded, the adjustments of the second cycle may exceed those of the first. Consequently, the adjustments in the maturity of a second cycle, following the older age of a first cycle, may reach a high degree of perfection. In the second place, the crest-lines of the escarpments or ridges in the second cycle will for some time retain the evenly bevelled form to which they were reduced at the close of the first cycle. When a region presents these two special features together, it can hardly be doubted that two cycles of subaërial denudation have been more or less completely passed through in its geographical development. A type of such an example of composite topography, that is, of a region whose features are referable to the work of two geographical cycles, is given in Fig. 3. The added strip of new coastal plain lies between the old and the new shore-lines. In their extension across it, the streams *c* and *e*, *g* and *h*, are engrafted in pairs. The escarpments, having been reduced to faint linear mounds at the close of the first cycle, now run straight along the strike of the controlling strata. The larger streams in particular possess strongly meandering courses, whereby they have departed more or less from their original lines. The subsequent streams have been much advanced, partly in the first cycle, partly in the second cycle; and they have shifted their courses a little down the dip of the weak strata that they follow. The identification of the several parts, as e', e'', e''', of a once continuous consequent stream becomes difficult and doubtful. The importance of the obsequent streams has somewhat increased. Supposing stream *h* to have been doubly beheaded by m'' and n'' in the second cycle, and therefore at a date after it had learned to meander in large curves, its lower course, h', will now be found "wriggling" in diminished volumo along the large curves that it once followed smoothly. The stream *c*, the master of the region, with increasing volume from its successive captures, will fill its curves well, and will even extend their radius as it cuts down to a new grade in the second cycle.

10. Although this is an overlong introduction to the remainder of the article, it is absolutely essential to the appreciation of the points that I desire to make; for unless the expectations and consequences of a reasonable theory are well worked out, there are no definite mental conceptions to be confronted by the facts. The deductions must be made as carefully as the inductions, the two classes of knowledge being held carefully apart until their comparison is undertaken. Then just in accordance with the degree to which the deductions and inductions match one another will confidence be allowed or compelled in the theory by which the deductions were reached. As a matter of practical

experience, it is seldom that every deduction will find its mate among the inductions, and *vice versâ.* There will nearly always be some fact of observation not accounted for by theory; some expectation of theory not discovered among the facts; and no part of careful investigation is more exhilarating than the search thus excited in quest of the missing mates. Finally, when the pairing off is essentially complete, conviction grows spontaneously, and the will has little to do with the belief.

The theory here outlined seems reasonable, because it appeals to no extraordinary processes, and because every one of its requirements in the earlier or later stages of its advance may be compared with the facts of some actual district, where the inferred conditions really exist. The once lofty mountains in Wales and northward, near whose leeward base there were interior saline lakes, may be compared with the now lofty mountains of California and Oregon, which withhold the rainfall from the arid plains to the east; indeed, under no other conditions can a dry climate be produced near the eastern side of a great ocean and in so high a latitude as 50°. The relation of simple and extended consequent streams on a new coastal plain may be well studied in the rivers of North Carolina. The progressive development of escarpments and of adjusted rivers can be followed in various stages on different parts of the coastal plain of our Atlantic and Gulf states; or again in north-eastern France, where the interaction of certain rivers is most beautifully shown in the neighbourhood of Châlons-sur-Marne. The even crest-lines of ridges and escarpments in the maturity of a second cycle following the old age of a first, are wonderfully displayed in the Appalachians of Pennsylvania, where the adjustment of the rivers to the structures is also most admirable. The processes of river development are not newly invented, but are such as have been worked out by Jukes, Heim, Löwl, Philipson, and others in Europe; by Powell, Gilbert, and others in America.

The theory is pertinent to the case in hand—the development of the newer rivers of England—for all manner of facts point to the former higher stand and greater mass of the mountains in the west; to their gradual submergence and burial in sheets of sediments that become thinner eastward (see "Areas of Apparent Upheaval," by W. Topley, *Quart. Jour. Geol. Soc.*, 1874, pp. 186–195), and more calcareous upward; then to the emergence of the sea-bottom, forming a new coastal plain, down whose slopes numerous consequent rivers took their way; to the special case of the consequent streams on the dome of the Weald; to the development of subsequent streams along the weaker strata, and the advance of river adjustments thereby; to the upheaval of the land after much work had been done in an earlier cycle, thus reviving the rivers for a continuation of their first-cycle work in a second cycle. Much of this is simply the standard material of English geology, and I need, therefore, call attention to only a few of these headings.

11. Let us consider first the evidence that may be found indicating that at least two cycles of subaërial denudation have been involved in the development of the geographical features of eastern England, the first cycle having reached old age, the second cycle being at present in its maturity. Look at the remarkable evenness of the Oölite and the Chalk uplands in Yorkshire, Lincolnshire, Oxfordshire, Surrey, and Kent. Ramsay repeatedly refers to these districts as "a tableland," "a second plain," "an upper plain," "flat-topped escarpments," in his 'Physical Geology and Geography of Great Britain.' Remember that the most reasonable view concerning the original extension of the strata of these uplands would carry them high in the air over the midland Triassic lowland and over the denuded area of the Weald, and then ask how the processes of denudation could reduce the original constructional extension of these strata to the even uplands in which they now terminate, the uplands being distinctly above the present baselevel of erosion. This question has evidently been considered; but the answer that I find current in the literature of the subject, as well as in the minds of several English geologists with whom I have lately discussed the question, is not altogether satisfactory. There is truly a general disposition to recognize the Oölite and the Chalk uplands as remnants of a once widely extended surface of denudation, but the agency by which the denudation was accomplished is thought to have been the sea; the uplands are regarded as the remnants of an uplifted plain of marine denudation, not of an uplifted peneplain of subaërial denudation.

12. It should not in this day require much argument to convince one of the abstract possibility of producing relatively even lowlands or peneplains either by marine or by subaërial denudation. Whatever the constructional mass may have been on which the destructive processes work, either process would slowly reduce it to an almost featureless peneplain, if time enough were allowed. Forty years ago, it was natural that marine erosion should have the greater number of advocates, as atmospheric denudation was not then fairly recognized. Now, although the efficacy of rain and rivers to produce cañons, valleys, and escarpments is generally admitted, there is still, strangely enough, a prevailing indisposition to follow the process to its legitimate conclusion, and recognize peneplains as well as valleys among its possible creations. This hesitation seems to me unreasonable. There should be no question of the ability of atmospheric denudation to produce peneplains; but there may, of course, remain a large question in trying to decide whether a given peneplain is the product of atmospheric or of marine attack.

It should be noted that, unlike many later writers, Ramsay explicitly included atmospheric processes in the production of what he called, for brevity, a plain of marine denudation. He refers to the open lowlands of the weak Trias and Lias areas in central England as broad plains, recognizing them as widened valleys. Mackintosh, on the other hand, in his 'Scenery of England and Wales,' may be taken as representing the extreme marine view; even interior lowlands, like those just referred to, being, in his opinion, of marine origin. Professor Green, on the other hand, states clearly the abstract possibility of subaërial denudation reducing highlands to lowlands; but he does not enforce the principle by examples. Sir Archibald Geikie describes the dissected plateau of the Scotch Highlands as the remnant of an uplifted plain of marine denudation in the first edition of his 'Scenery of Scotland;' but in the second edition he seems to give preference to subaërial denudation.* The important point, however, would seem now to be the invention of criteria by which plains of truly marine denudation may be distinguished from those that have been exposed only to the attack of the atmosphere.

13. The solution of this question can only be reached by special studies of each case, when its particular features must be examined to see if they bear the marks of one process or of the other. The uplands of the Oölite and the Chalk seem to me to be remnants of a peneplain of subaërial denudation, for the reason that their drainage is accomplished in great part by subsequent streams (more fully stated below), as should be the case if the present streams are the revived successors of those of a former cyle of atmospheric denudation; and not by superposed streams

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* A note may be introduced here in order to call attention to one conclusion in that admirable book which does not seem compulsory. Although perhaps not absolutely stated, it is clearly implied that it was Devonian erosion by which the once low and comparatively even surface of the now uplifted and dissected Highlands was produced. It is plainly manifest that Devonian erosion consumed a great volume of the contorted and overthrust rocks of the Highlands: witness the great volume of the Devonian strata lying unconformably on the Highland rocks, and the identity of the Devonian conglomerate pebbles with the rocks of the older terranes. It may indeed be well argued, from Sir A. Geikie's essay, "On the Old Red Sandstone of Western Europe" (*Trans. Roy. Soc. Edin.*, xxviii., 1879, pp. 345-452), that a vast denudation was accomplished in earlier times than Old Red, and that by the close of the Old Red period the Highland region must have been truly a diminished lowland, a peneplain, of small area and moderate relief. But, on the other hand, the Old Red sandstones, in certain parts of the Highland region at least, have been much disturbed, tilted, and faulted; and it is in the highest degree probable that the ancient peneplain produced by Old Red denudation, marine, subaërial, or both, has also been disturbed, tilted, and faulted since Old Red times: and hence that the once roughly evened upland, in which the greater number of the present glens have been eroded, was produced at some time *after* the deformation that disturbed the Old Red formation. The date of this later denudation is at present indeterminate, but the altitude attained by some of the Tertiary dikes in the Highlands would indicate that not only the glens were of later origin than the dikes, but that even some of the finishing touches in the production of the rough-cut old Lowland—now Highland—were of later date than the volcanic period of that magnificent region. Indeed, it seems very doubtful if anywhere in the world, even in regions of the most resistant rocks, even a trace of a Devonian land surface, from then till now exposed to erosion, could be preserved.

imperfectly adjusted to the structures, as should be the case if the region had been denuded by marine action, and then elevated to its present altitude above sea-level. This distinction deserves a brief digression.

The original conception of a plain of marine denudation as presented by Ramsay fifty years ago, and as still commonly accepted, involves the idea of a gradual sinking of a land-mass, while the forces of the atmosphere are wasting its surface and the waves of the sea are eating into its margin. If the sinking be slow compared to the in-cutting of the waves, the land will be cut down to a comparatively level platform; any rivers that existed on the land surface will be extinguished, and the greater part of the platform will be strewn over with the waste from the shore. When elevation sets in, the platform will rise with the cover of marine sediments on its back; an entirely new system of drainage will be developed, consequent on the constructional slopes of the new land-area, and although the streams thus originated may in time cut through the cover of marine strata into the under-mass, although the marine cover may be quite stripped off so that not a remnant of it remains, although the streams may become somewhat adjusted to the structure of the under-mass as their valleys are cut down into it,—yet it seems impossible that the adjustments thus gained in a single cycle should be nearly so perfect as those that *must* obtain in consequence of two cycles of subaërial denudation. It must be carefully borne in mind that the hypothesis of marine denudation requires the extinction of all previous drainage systems and the inception of a new system of streams, consequent upon the slopes of the "cover," but entirely independent of the structure buried beneath the cover; while the hypothesis of subaerial denudation as distinctly requires the retention of a previously maturely adjusted drainage system, excepting for a partial loss of adjustment caused by the wandering of the streams in their old age. It must be remembered that the hypothesis of marine denudation demands the beginning of the present cycle of denudation without any subsequent streams; while the hypothesis of subaërial denudation equally demands the existence of a considerable number of subsequent streams at the time of upheaval. All things considered, a region with uplands so even and with so many subsequent streams as eastern England possesses should, I think, be regarded as now standing in its second cycle of subaërial denudation, and not in a first cycle of subaërial denudation, following a former cycle of marine denudation.

14. There are certain rigidities of conception that must be guarded against in considering this problem. It need not be supposed that the former cycle of denudation reduced the region to a dead level. Most of the peneplains that I have examined, even though now uplifted and somewhat advanced in the dissections of a second cycle, still possess residual elevations, rising somewhat above the general upland, and evidently to be regarded as unconsumed remnants of the denudation

of the former cycle. From the need of reducing such matters as these to some simple form of statement for use in teaching, I have fallen into the habit of calling a residual mound of this character, a *monadnock*, taking the name from that of a fine conical mountain of south-western New Hampshire, which grandly overtops the dissected peneplain of New England. Of course there may be little monadnocks or great ones, they may be few or many, but in my views of the wolds and the downs I saw none of them; the peneplain in which the valleys of old England are etched seems to have been a very smooth one. Again, it must not be assumed that the once nearly level surface of the peneplain was lifted up with perfect equality of elevation. Not only was there probably a greater elevation in the west than in the east; there may have been also widespread or local warpings, some of which may have been strong enough to affect the courses of the old streams at the time of their revival into the present cycle. This must be discovered by a careful determination of the height at which various parts of the still preserved peneplain now stand, in the manner adopted by Messrs. Hayes and Campbell, in their recent study of the southern Appalachian mountains (*National Geog. Mag.*, Washington, 1894); and I shall hope to see this problem undertaken by some English student of physical geography, who has the country, the maps, and the literature of the subject close at hand. Finally, it must not be supposed that the movements of elevation here referred to are the only ones that have to be considered; they appear to be the chief ones, but the effects of other movements, as well as of glacial episodes, must be carefully examined when the subject is minutely studied, instead of broadly sketched.

15. We may next consider how far the expectations of theory concerning the arrangement of river courses, summarized in Fig. 3, are confirmed by the actual arrangement of river courses in eastern England. This may be best done by attempting to classify the existing rivers as consequent, subsequent, and obsequent; noting at the same time the relation that the consequent streams have to the process of capture or diversion by the appropriate subsequent streams, as indicating the degree of perfection to which the adjustment of streams to structures has advanced. The subsequent streams must, of course, occur only along the strike of relatively weak rocks; the obsequent streams run against the dip of the strata, down the face of escarpments of greater or less strength; the consequent streams run with the dip of the strata, still possessing a considerable length if not broken by the subsequent branches of larger consequent streams, but often reduced to moderate dimensions when repeatedly beheaded by diversion and adjustment.

16. Beginning in the north, we find the Tees and the Swale-Ouse to be subsequent streams on the New Red lowland, each of them serving as diverters of various consequent streams that come down from the Carboniferous uplands on the west, and each receiving various "becks"

from the Oölite escarpment on the east. The success of the Tees in gathering consequent head-waters from inland is lessened by the interposition of the magnesian limestone escarpment, back of which the Wear carries away a number of head-waters from Bishop Auckland northward. The Swale-Ouse does better: the Swale, Ure, Nidd, Aire and Calder, Dearne and Don are all turned along the open subsequent valley of the Swale-Ouse, unable to maintain the straight consequent courses that they may be inferred to have had initially across the Oölite and the Chalk; the Aire and Calder, the Dearne and Don, joining forces in pairs behind the magnesian limestone. Representatives of the middle parts of some of these original consequent rivers should be found among the diverted consequent branches of the subsequent Yorkshire Derwent, such as the Rye, Riccal, Dove, and Severn rivers, and the Costa, Pickering, and Thornton becks. Still lower parts of the original consequent rivers of the region should be looked for on the back or eastern slope of the York wolds from Great Driffield to Hull. The subsequent valleys of the Tees and the Swale-Ouse on the New Red, and of the Derwent on the weak Upper Oölite, receive appropriate obsequent branches in many small streams and becks from the faces of the adjacent escarpments. The water-parting, or "divide," between the subsequent courses of the Tees and

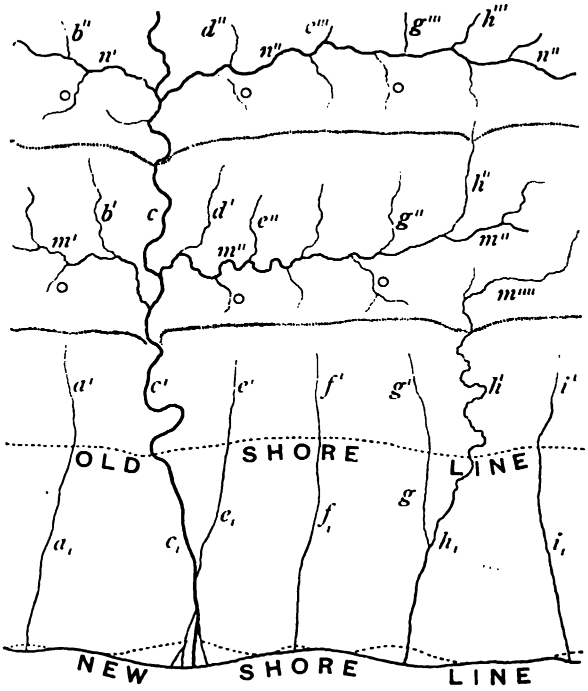


FIG. 3.

the Swale should be carefully studied; for at such a point of competitive capture, a slight change in the altitude of the land, as by an elevation or depression on the north or south, will give one stream an advantage over the other, and thus cause a shifting of the neighbouring consequent head-water stream from one system to the other. The peculiar position of the head of the subsequent Derwent, close to the sea, suggests some glacial interference with normal adjustments, and calls for special explanation.

The Humber, enlarged by drowning and by resultant tidal action in its lower course, should be looked upon as the main consequent trunk stream of the region, its upper course having been perhaps somewhere about Halifax or Huddersfield; but its present importance is due to the great success of its chief subsequent branches, the Ouse, the Idle, and the Trent. There should, however, be some reason for the successful growth of the Humber at the expense of its early rivals. It may have been originally the largest consequent stream of the region, or the thinning of the Oölites on its lower course may have given it an early advantage (though in this case it ought to lie a little further north).

Like the Yorkshire Ouse, the Idle and the Trent gather a number of consequent head-waters from the high ground of the Carboniferous on the west, many of these being more or less divided by subsequent streams on the softer strata of the region which they drain. The course of the Trent at Nottingham is certainly a fine case of adjustment to the weak sandstones, and of avoidance of the harder Carboniferous rocks on the north and the Lias hills on the south-east. Superposed drainage, settling down into unknown structures through an unconformable cover, such as must have cloaked the region if it had been denuded by marine action, could not be expected accidentally to hit upon so suitable a path. Similarly, the obsequent-subsequent course of the Soar, between the resurrected Carboniferous hills about Ashby-de-la-Zouche, and the retreating Lias upland to the east, should not be ascribed to the chance of superposition. Likewise, the centrifugal drainage of the Carboniferous west of Birmingham, to the Trent on the east, and the Severn on the west, does not imply a haphazard origin of stream courses, but an origin by the patient processes of natural selection. All these cases, taken together, seem to me to call imperatively for an arrangement of stream courses by systematic adjustment.

One of the greatest successes of the Trent was the capture of the upper Witham, as explained by Mr. Jukes-Brown, in an article already referred to. It is interesting to notice that this capture was effected so lately in the present cycles, that the Trent has not yet been, and probably will not be, able to send out an obsequent branch through the Lias belt, and push the head of the Witham back to the Oölite outcrop at Lincoln. The transverse-consequent Witham still retains the longitudinal subsequent Till on the north, and Witham-Brant on the south, with appropriate obsequent branches; but if the land should be raised a few hundred feet, these head-waters would soon be gained by the Trent; and the divide between the successful and defeated systems would be pushed to the notch in the hard Oölite, which would then be a "wind-gap," instead of a "water-gap," as the Pennsylvanians say. The smaller longitudinal subsequent branches of the Humber, between the uplands of the Chalk and the Oölite, deserve brief mention, as illustrating even in a minute way the important part played by adjusted drainage lines.

Most of the rivers that enter the Wash drain a region of nearly horizontal structure; hence their adjusted courses are not of so distinctly a rectangular pattern, as is illustrated in Fig. 3. Still, their frequent choice of longitudinal courses on the weaker formations indicates that here, as elsewhere, the rivers have been left to themselves to work out their own evolution. The Glen to the north of Stamford, and the Nen to the south, are subsequent streams on the weaker beds of the Oölite; the Welland, Gwash, Chater, and Eye being parts of consequent streams that have been captured by these subsequents; and the obsequent branches of the Soar working against these consequents on the western side of the Lias highlands. The Bedford Ouse is a rather irregular subsequent river on the Upper Oölite, south of the Wash, corresponding to the lower Witham on the north. The Tove is one of its consequent branches. The Stoke, Little Ouse, Lark, Ivel, and Ousel are normally developed obsequents, working against the retreating Chalk escarpment. The Cam is subsequent while on the Upper Greensand, but has an obsequent head, working back by Saffron Walden.

Of all the river contests in England, that by which the Thames system has been shorn of its original importance is the most interesting. Here I must regretfully differ from the suggestion made by Ramsay as to the consequent origin of the Severn in an initial constructional trough of the uplifted Mesozoic formations. There is no sufficient evidence that such a trough ever existed; and there is no need for it, if the Severn, like the Trent and the Yorkshire Ouse, be regarded as a subsequent river. Ramsay does not seem to have considered that possibility, but I believe it has been suggested by Mr. Marr. A subsequent growth seems to me much the more plausible explanation for its course along the weak beds of the New Red and the Lias. It gathers a great drainage from Wales, that used to go to the western branches of the Thames system; the Warwick Avon still farther shortens these branches; while the Trent and the Bedford Ouse carry away the heads of many original northern branches. Only the southern branches of the Thames, draining the northern slope of the dome of the Weald, retain anything like their original extension.

The longitudinal axis of the Thames system, following an eastward-dipping synclinal trough, now heads in the Kennet by Marlborough; it has probably been shortened by the growth of the obsequent head of the Bristol Avon. Running generally south-eastward into this trough from the slope on its northern side, there should be, if no adjustments had taken place, a number of long consequent streams, heading at least as far westward as the Mesozoic strata stretched, and possibly rising in extended streams from such parts of the Welsh highlands as were not submerged and buried by the Chalk. There is much probability that such streams once existed; but now nearly all of them have been broken into three parts by the growth of subsequent streams along the New Red and the Middle Oölite. Even four or five parts may be recognized in some cases, if the subsequent streams on the Lias and the Upper Oölite are included; but I would not go so far as to imply that the successive parts of any single original consequent stream can now be surely identified. The Thames from Reading to Oxford, with the Cherwell or the Evenlode above Oxford, makes the longest remaining part of an initial consequent stream; and it is interesting to notice that these two upper streams still drain a moderate area of Lias country, beyond the Oölite upland, and between the competing head-waters of the subsequent Warwick Avon on the west, Bedford Ouse on the east, and Trent on the north. This is precisely the region where the longest remaining parts of the initial consequent streams should be expected; and in this region there are no distinct obsequent branches of the Avon or the Ouse, although such obsequents are represented by the Ousel and Ivel farther east, and by the Stour, Isborne, and Chelt farther west. Whether the upper Severn represents the original head-stream of the Cherwell or of the Evenlode is a matter for speculation rather than for demonstration. South-east of the Oölite margin, the upper Ray on the east of Oxford, and the Windrush, Coln, Churn, and Swill on the west, are short medial parts of consequent streams which have lost their heads by the successful growth of the Ouse and the Avon, and which have been diverted from their former lower courses by the two subsequents, the lower Ray on the east of Oxford, and the Isis on the west. The Thame and the Ock make another pair of subsequents, entering the Thames from east and west below Oxford. Crossing now to the Chalk, the Lamborne may be regarded as the beheaded lower part of the Coln or the Churn. Then, going eastward, we find the Ray, Misbourn, Chess, Colne, Gad, Ver, Lea, and Beane, all representing the lower parts of beheaded consequent rivers; and it is very noticeable that the deepest valleys through the Chalk, like that of the Colne past Berkhampstead, and the furthest reaching heads, like that of the Lea, which reaches the Greensand, lie in the region between the heads of the competing subsequent Thame and Ouse. Some of these reduced consequent streams appear to show slight adjustment by short subsequent streams along the outer margin of the London Clay.

South of the longitudinal Thames, the drainage of the Weald dome is very simple and systematic. On the northern slope, the Stour holds its own; the Medway has taken off the head of the Darent; the Mole has beheaded a stream that used to go through the Merstham notch to Croyden; and either the Mole or the Darent has beheaded a stream that made the notch at Caterham Valley; the Wey has recently taken off the head of the Blackwater, near Aldershot. On the southern slope, the Cuckmare, Ouse, Adur, and Arun maintain open paths to the sea. Inside of the Chalk escarpment, the drainage is often by subsequent side streams, whose development has been described by various authors. Outside of the escarpment, there are many small streams that may be regarded as shortened consequents, whose beheading was accomplished early in the denudation of the region. The most peculiar feature of the Weald is that the Stour and the Cuckmare should not have ere now been more shortened by the inward growth of subsequent streams from the coast of the Channel between Folkstone and Eastbourne; as it is, the Rother, in the middle of this district, has hardly accomplished any notable depredations.

17. Now, while any one of these many examples from the Tees to the Cuckmare, if taken alone, might perhaps be explained in some other manner than the one here suggested, it does not seem to be within the reach of reasonable probability that so many streams and rivers should repeat over and over again the simple variations of a single theme, unless they had been developed in a uniform and systematic manner. Further, the great number of subsequent streams, well adjusted to the weaker structures of the region, cannot be possibly explained as superposed from a marine cover; they cannot, indeed, be reasonably explained as the product of a single cycle of subaërial denudation; and if they could be, there would then be no explanation for the "upper plains" and the "tablelands" of the Oölite and the Chalk. Taken altogether, it seems that the most probable explanation is the one announced at the beginning of the essay: that the rivers of eastern England are now in the mature stage of the second cycle of subaërial denudation of a great mass of gently dipping sedimentary rocks, and that they have in this second cycle extended the adjustments of streams to structures that were already begun in the first cycle.

THE GREAT SIBERIAN RAILWAY.

By P. KROPOTKIN.

This great line, which is to connect European Russia with the Pacific Ocean, is steadily progressing eastwards. It has already reached the Irtysh opposite Omsk, and will soon reach Tomsk, in the very heart of Siberia; while on the other end of the line, the Usuri river is already connected by a railroad with the shores of the Pacific. Of a total length of nearly 4700 miles, rails are already laid over 1006 miles—that is, 68 miles more than one-fifth part of the whole distance.

There was at the beginning a great deal of hesitation as to whether Central Siberia had to be reached from the north or from the south. The northern line offers many substantial advantages. It follows the great high-road along which the immense caravans of tea from Siberia, and of all sorts of goods sent from Russia to Siberia, are now transported; and, after having crossed the Urals in the east of Perm, it enters, on the Siberian slope, the regions of rich ironworks, which can supply the railway with rails, engines, and waggons. Then it passes through Ekaterinburg, the centre of all the mining of the Middle Urals, and, turning sharp eastwards, reaches Tyumen, on the Tura. This northern railway, which was completed several years since, is already of great importance. It connects the Kama with the Siberian rivers of the Ob-and-Irtysh system—that is, two immense channels of inner navigation. The Kama, with its large tributaries —Vyatka, Byelaya, Chusovaya—and a basin covering no less than 202,600 square miles, waters in its upper parts a most important region containing a great number of ironworks, and for the last two centuries it has been the chief artery for communication with Siberia. As to the West Siberian rivers, they undoubtedly will maintain their importance for shipping, even after the Siberian railway is completed. Though standing on a small tributary of the Tobol (the Tura), which itself flows into the Irtysh, the present terminus of that railway, Tyumen, must remain a centre of importance for all the traffic in heavy goods coming from Siberia, or shipped from the Urals to Siberia. It must be remembered, moreover, that Tyumen stands in easy communication with the Arctic Ocean, and that long before a more or less regular traffic had been established between Europe and the Yenisei, a little schooner, built at Tyumen and floated down the Tura, the Tobol, and the Irtysh, went to London with a cargo of Siberian wheat. Now, Tyumen stands in regular steamer communication with Tomsk and with Biisk, in the Altai, as well as (*viâ* the Irtysh) with Omsk and Semipalatinsk, on the border region of the Central Asian steppes. True that the Tura, on the banks of which Tyumen stands, is a shallow river which often becomes still more shallow in the summer; but this inconvenience can easily be remedied by continuing the main line for a short distance along the Tura, to its junction with the Tobol. In short, even when the Siberian railway will be completed, the northern Perm-Tyumen line will remain the chief channel of traffic for a wide, populous, and in parts densely peopled and most fertile region, which owing to its thoroughly Russian population, is considered as the granary of West Siberia. Moreover, it brings the chief ironworks of the Middle Urals in direct rail communication with the Kama, which means, in fact, with the Volga, or with all Central Russia. Therefore, the main line, Perm-Tyumen, 511 miles long, has been very wisely provided with several branches. One of them runs north-west from the Chusovaya station to Bereznyaki, also on the Kama, but higher up, near Solikamsk (130 miles); and a second branch (25 miles) joins the Ostrovskaya station, on the Iset river, with the main line; while this last passes, besides Ekaterinburg, through such important centres of iron industry as Kushva, or Kushvinsk, and Nizhne-Taghil, a mining town of nearly 30,000 inhabitants.

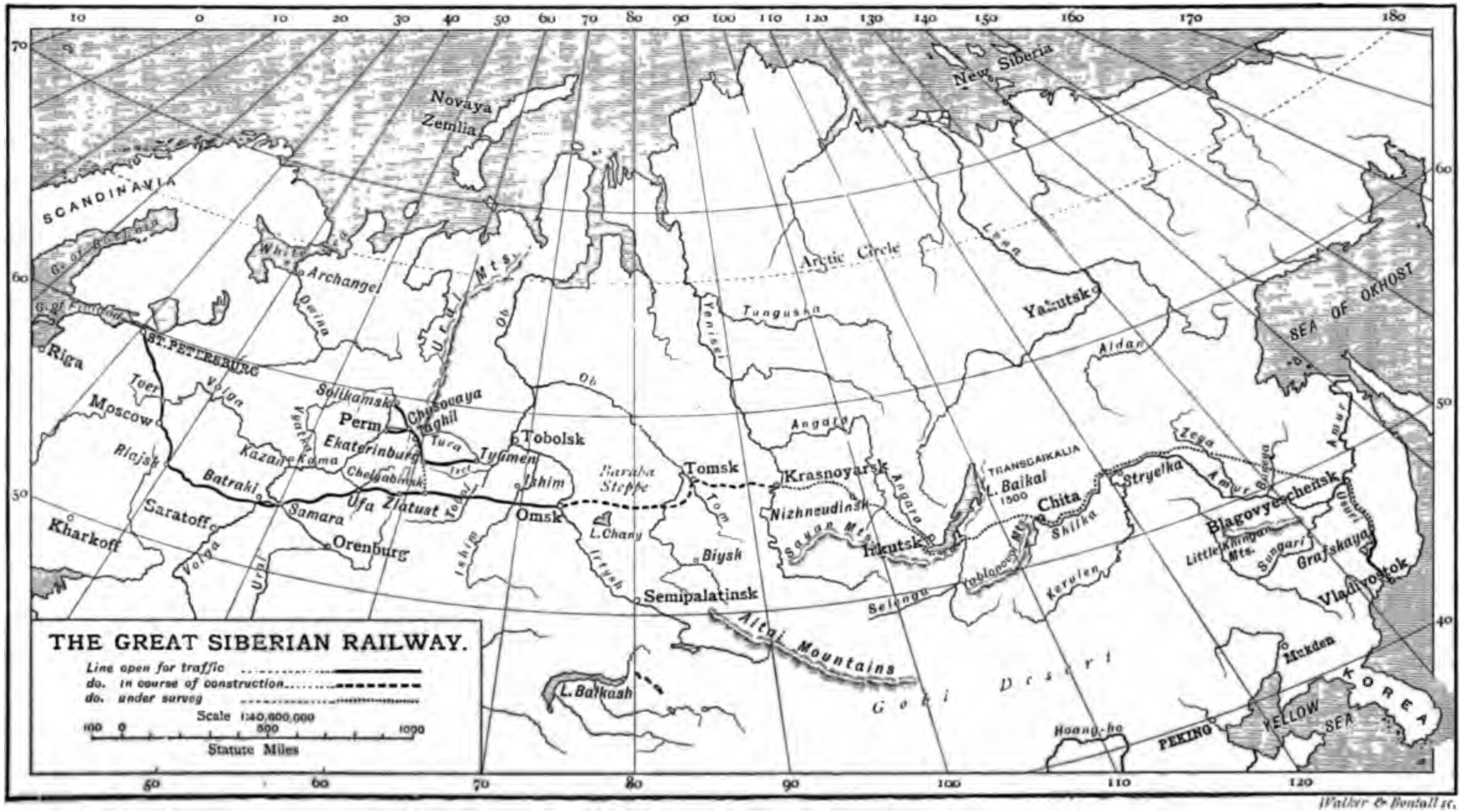
However, this northern line could not satisfy the need of a railway to Siberia. Perm is not yet connected by rail, and will not be connected in a near future, with the railways of Central Russia, because the very thinly inhabited forest tracts which cover the lower Kama between Perm and Kazan belong to the least productive parts of Russia. Altogether, it is a fact, which cannot be too much insisted upon, that the centre of Russian life has been moving southwards during the last thirty years. It is no more in Moscow and the surrounding provinces, but in the belt of fertile black earth which runs south-west to north-east, from Bessarabia to the Urals, that the "density centre" of the population of Russia is now situated. In this belt are those towns of Russia which, apart from the capitals, have populations of over 100,000 inhabitants (Kharkoff, Kieff, Kishineff, Saratoff, and Samara), and become centres of industrial and intellectual life.

It was, therefore, of first importance to connect the fertile and more densely peopled parts of South Siberia directly with South Russia, and Samara was readily indicated as the head of the Trans-Siberian railway. This young city on the Volga has a population of 100,020 inhabitants, and is rapidly developing; and since the Volga has been spanned by a great iron bridge at Batraki, 76 miles to the west of Samara, this last stands in railway communication with all the railways of Central Russia, its distance from Moscow by rail being 611 miles. From Samara the main line shoots straight east-north-east towards Ufa (224 miles), which is built on the right bank of the Byelaya, at its junction with the Ufa river. Ufa itself has but lately begun to grow, and has only 30,000 inhabitants; but it is situated amidst a very fertile region, rapidly peopled by settlers from the middle provinces, and becomes an important centre of extensive agriculture. Another 200 miles in the same direction bring the railway to Zlatoust (20,500 inhabitants), the rival of Ekaterinburg, and the centre of the great iron and gold mining district of the Southern Urals. The mountains are crossed here in a depression between the mountains Taganai and Urenga; the important ironworks of Miyas are passed by, and Chelyabinsk, 522 miles from Samara, is reached. Up to this little spot, which had in 1891 only 11,200 inhabitants, the railway is quite ready, and there is regular passenger and goods traffic. It must also be said that the line is far from being idle, considerable amounts of corn and all sorts of produce of cattle-breeding being already exported westwards from the Kirghiz steppes.

Chelyabinsk stands on the border of the prairies of South-West Siberia, a low watershed only separating them from the prairies of the upper Ishim, which belong to the outer borderlands of Central Asia. At Chelyabinsk begins the first section of the Siberian railway proper, which strikes due east, along the 55th degree of latitude towards Omsk. This section, 491 miles long, which crosses the Ishim and the Tobol rivers, has lately been completed, so that the railroad now reaches the Irtysh, opposite Omsk. According to the report laid before the railway committee in December last, the line is completed on the whole distance, with the exception of three big bridges which are being built. One-half of all the buildings which have to be erected along the line are ready, and among them the arrangements for supplying the line with water are not the least important. All waggons and one-third part of the necessary engines are already on the line, and third-class traffic has been opened, although goods and passengers have still to be transferred for crossing the three rivers, not yet spanned by bridges.

The next section is from Omsk to Tomsk, a distance of 350 miles. Apart from two colossal bridges which have to be built over the Irtysh at Omsk and the Ob, and a smaller one across the Tom, there will be no technical difficulties in building that section. It crosses the level and fertile Baraba steppe, dotted with relatively wealthy villages of Russian peasants. There will also be no difficulty in obtaining water from wells or from lakes—the main difficulties being only to be foreseen in the future, as the whole of this region, as shown by the well-known maps of the late N. Yadrintseff, desiccates with a rapidity which upsets all the former calculations of geologists. But the building of the bridges over the Irtysh and the Ob, which both carry immense quantities of ice in the autumn and the spring, and inundate their low shores in the summer, will undoubtedly represent a difficult and costly engineering feat. Even the comparatively much smaller Tom is by no means an easily manageable river, especially when it is covered in the autumn with a thick layer of rapidly moving ice. At the present time (December, 1894), three-fourths of all the earthworks which have to be done in this section are already accomplished, and the rails have been laid over the first 70 miles.

Tomsk, the capital of West Siberia, is a great centre of Siberian life. Its population has lately doubled, and attains now 42,000. It has now a university, and is the centre for all the trade with the rich Altai mines and agricultural settlements, while the population of the surrounding region increases every year by scores of thousands of immigrants from European Russia. Since the last famine in Russia,



the number of immigrants to Siberia has rapidly grown to 100,000 every year, so that the immigration had to be organized on a larger scale for alleviating the sufferings of the masses of peasants, who formerly rushed to Siberia without knowing where they would find free land to settle upon, or how they could reach it. Most of them settle in the government of Tomsk. As to the city of Tomsk, its recent rapid growth is chiefly due to its having been brought into regular steamer communication with Tyumen, which, as already mentioned, stands in rail communication with the Kama at Perm. It may, therefore, be safely concluded that from the day Tomsk is brought in uninterrupted railway communication with Russia, the town will grow still more rapidly, as also the population of the surrounding plains and the rich valleys of the Altai—a region much like Switzerland in physical features, but three times as large.

The next section, between Tomsk and Krasnoyarsk, or rather between the Ob and the Yenisei, enters East Siberia. In the west of the Tomsk the railway crosses the *lowlands*, that is prairies, rising only by 200 and 300 feet above the sea; but further eastwards it will have to cross the first terrace of the high plains of East Siberia, which lie over 1000 feet above the sea-level, and are an undulated plateau, intersected here and there by low ranges of hills—the outspurs of the mountains lying further southwards. On this section, 38 per cent. of all the earthworks which had to be made for the railway were accomplished in December, 1894, and it was expected that by January 1, 1895, the rails would be laid over a distance of 200 miles.

The third section, between Krasnoyarsk and Irkutsk, will offer more difficulties. First of all, the railway will have to cross the broad and rapid Yenisei, which flows at a level of 410 feet only at Krasnoyarsk, and immediately after that it will have to rise again to a level of over 1000 feet—that is, to the level of the high undulating plains which fringe the great plateau of East Asia. The spurs of the Sayan Highlands reach here to 2029 feet, while the rivers are deeply cut into the high plains. Of course, such conditions offer nothing which would much differ from the usual conditions of railway building in Middle Russia itself, but in East Siberia the laying down of the rails certainly will not progress with the same rapidity as it has hitherto progressed in West Siberia, while the cost of the construction will be considerably increased. Detailed researches only have been made up till now in this section. But it is well worth mentioning that, at the same time, engineering works have been accomplished on the Angara, in order to clear its bed from the rocky rapids which hitherto stood in the way of navigation on this beautiful river. The Angara connects, as is well known, Lake Baikal with the Yenisei, and now, after the persevering efforts of Captain Wiggins, a water communication between Irkutsk and the Yenisei means a water communication with West Europe. The rapids of the Angara below Irkutsk are not very dangerous, smaller boats having always navigated in this part of the great East Siberian river, and a little clearing of the bed will, and partly has, set things right; but the rapids between Irkutsk and Lake Baikal will be much more difficult to clear; however, during the last summer some progress was made in this part of the river as well, and the day is not far distant when Irkutsk may become the port of Lake Baikal, although this seemed quite hopeless thirty years ago.

At the present time, only researches are being made for the further continuation of the Siberian railway, and the last reports are that an easy passage has been found across the eastern border-ridge of the high terrace of the plateau—the Stanovoi or Yablonovoi Mountains. This is what may have been expected. As to the western border-range of the same plateau, it will offer no difficulties whatever, as it is pierced by the broad valley of the Selenga and the Uda, which appears as an immense railway trench, rising with a gentle gradient from Lake Baikal (1500 feet) to the Stanovoi water-parting, 4000 feet above the sea. The most difficult part of the railway between Irkutsk and Chita (at the eastern foot of the Stanovoi water-parting) is where it has to follow the south coast of the Baikal, for which purpose a way must be cut through the rocky crags rising abruptly from the waters of the lake. But here, also, the most difficult part of the work was done in 1865–1866 by the Polish exiles, who built the present high-road along the southern shore of the lake, breaking the rocks in Siberian fashion, with the aid of water poured on the rocks after they had been heated by big fires, and allowed to freeze in the crevices.

The real engineering difficulties will begin only when the railway is built between Chita and the Amur, where it will have to cross a series of parallel ranges, through which the lower Shilka has pierced its rocky channel. But a few years will pass before work is started in this part of the Grand Railway trunk.

In the mean time, the railway progresses at its other end, on the shores of the Pacific. A telegram received at St. Petersburg at the end of December last announced that the rails had been laid from Vladivostok to within one mile from the village Grafskaya, on the Usuri—that is, on a distance of 250 miles. Technically speaking, this section offered no difficulties, apart from some marshy places which the line had to cross. The difficulties were rather in the absence of population. But to this difficulty, which also will be met with further down the banks of the Usuri, a new one will be added. The fact is, that the Usuri, like the lower Sungari, and the banks of the Amur between the Little Khingan (Dousse-alin) and the mouth of the Usuri, belong to what Peschel described as "young river valleys." The whole of the middle Usuri region was quite recently (in the later Post-Pliocene times) an immense lake, which only lately began to desiccate. The Usuri and its countless smaller tributaries have not yet dug out permanent beds across this flat and low country, and every year, in July and August, when the torrential rains brought by the monsoons begin, the whole is transformed into a labyrinth of ponds, marshes, and lakes. This is why the population, which had been settled along the banks of the Usuri at regular intervals of about 18 miles, could cultivate the low ridges only which intersect this periodically inundated land, and, after having vainly struggled for years against nature, permission was given (upon a report of the present writer) to leave those villages, and to settle elsewhere, on the Pacific coast. The Railway Committee having now decided again to repeople this part of the Usuri region by settlers from Transbaikalia, there is great danger of their meeting with the same failures as before, unless, of course, a better exploration of the whole district leads to the discovery of spots better suited for a permanent population. At any rate, the railway engineers will have to contend with great technical difficulties in crossing the lowlands of the Middle Usuri,* and perhaps they will be compelled to seek for a more advantageous direction of the railway, at the foot of the mountains some way off the banks of the Usuri itself.

It must be owned that for some time to come the railway along the Amur and the Usuri will probably remain a mere strategic line. Of all the immense territory which goes under the name of the Amur Region, only the space between the Zeya and the Bureya rivers, in the east of Blagovyeschensk, offers a really rich territory for human settlements, owing to its fertile soil and elevation above the level of the rivers. The remainder, in the north-west of Kumara, is but a valley cut through the high plateau, surrounded by extremely cold and wild highlands; and in the east of the Little Khingan there are but the more elevated flat ridges which are suitable for settlements, while all that surrounds them belongs to the just-mentioned type of periodically inundated marshy low plains.

Quite different is the railway across West Siberia and the governments of Irkutsk and West Transbaikalia. Millions and millons of human beings may find in these regions all that is wanted for a rich development of agriculture and all sorts of industries.

A few words need, perhaps, be added as to the remarkably low cost of travelling to Siberia. Under the present tariff, the distance of 2180 English miles from Granica, on the Austrian frontier, to Chelyabinsk—*viâ* Warsaw, Brest-Litovsk, Vyazona (150 miles before reaching Moscow, where the line starts to Samara), and Samara—is covered for less than £5 (47 roubles) in the third class, and for £9 2*s*. (91 roubles) in the second class. Another pound would pay a third-class ticket to the station on the Irtysh opposite Omsk. But even these low fees will be reduced under the new zone-tariff which is going to be introduced.

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* It is worth noticing that when the writer went up the Sungari in 1864, he met, on the lower Sungari, with a region of exactly the same character, which the Chinese had abandoned as quite hopeless for colonization on account of its low-lying character and inundations.

DR. SVEN HEDIN'S TRAVELS IN CENTRAL ASIA.

[We have received the following communication from Dr. Sven Hedin, dated from Kashgar, November 9, 1894:—]

I have just returned from Mustagh-ata, . . . and send you a short account of the work done during the past summer. On June 21, 1894, I left Kashgar and proceeded by way of Yangi-Hissar and Ighiz-yar to the valley of Gedyek, and thence to that of Kinkol. Having crossed the passes of Chichikli, Kichik, Khatta, and Kokmamak, I reached Tagharma, and advanced by Ulugh-rabat to Su-bashi (July 8). At the latter place there is a Chinese fortress, situated at the western base of Mustagh-ata. Along the whole route I made a topographical map, collected specimens of rocks, and made geological observations which will complete those of Bogdanovich. I regularly made meteorological observations thrice daily with three aneroids and a boiling-point thermometer, and on every opportunity took photographs and studied the mode of life of the Kirghiz.

From July 12 to 25 my camp was situated at Little Kara-Kul and at Bassik-Kul. The whole of this neighbourhood was surveyed with great care, in order to serve as my base of operations for the whole country. Geological, climatological, and other investigations were continued, and numerous excursions made in all directions. Little Kara-Kul is an obstruction lake dammed by the moraines of a glacier which has long since retreated, and is now represented by several small glaciers in the upper slopes of the Mustagh-ata. The moraines of this old glacier, however, still remain, and have blocked the valley of Sarik-Kol in such a way that the water issuing from the glaciers further south accumulates and forms a Lake. Hence Little Kara-Kul is also a settling basin for the river; the glacier water entering at the south end carries in large quantities of glacial mud, while the little stream that issues from the northern end is quite limpid. The alluvium accumulated at the upper end, where it forms an abrupt slope to the deepest portion of the lake. Availing myself of a boat made of skins, I measured the depths at 103 different places. The maximum depth of 78 feet is found in the southern half; the centre in general varies in depth from 50 to 65 feet. The water is clear, fresh, and excellent to drink. Several springs enter the lake at the foot of the crystalline rocks which rise on the eastern and western shores. The stream of Kara-Kul falls into the Ike-bel-su, a river of considerable size during summer, but almost dried up in winter. It forms the upper course of the Gez-daria.

Bassik-Kul (north-west of Kara-Kul) consists of two basins separated by very low ancient moraines. During summer a little stream from the lower basin joins the stream from Kara-Kul. It is a curious fact that there is no visible communication between the two basins of Bassik-Kul, in spite of the two streams which fall into the upper basin. Probably some subterranean communication exists, or the water filters through the materials of the moraines.

Between July 25 and August 19 I visited eleven glaciers on Mustagh-ata, of which six in particular have been very well explored. On three different occasions our camp was pitched at a height of about 14,000 feet. The Kirghiz have no special names for these glaciers, but I have made use of those of the springs, or of the streams found in the little channels of the valleys. The principal glaciers are—Gorumde (towards the north), Sarimek, Kamper-kishlak, Yam-bulak, Tyal-tumak, Tergen-bulak, Chum-kar-kashka (toward the west). Kok-sel, Sar-agil and Shweragil (towards the south-west) are less considerable, the two last-mentioned being almost inaccessible owing to their great height and the gigantic moraines which bar every approach. The most considerable to the north-east is Kok-sel (II.). The Kirghiz say that there are glaciers to the east also, but that they are very small. The eastern slopes of the mountain are almost inaccessible owing to the spurs covered with ice. I tried to surmount these obstacles from both sides, from the south by the valley of Tegerman-su, and from the north by those of Tur-bulung and Kara-Shilga, but was not able to proceed. The motion of even the largest glacier is so slow that I was able to detect a very slight movement during the month of September only by using the most delicate instruments. The greater number of glaciers melt at heights varying from 13,800 to 14,500 feet.* The glaciers were formerly of enormous size, as can be seen from the moraines of gneiss and crystalline rocks which surround the foot of the mountain. Whenever it was possible, I marked on the map the position of the vestiges of ancient glaciers. Even at Bassik-Kul I found erratic blocks of 30,000 to 40,000 cubic feet in size, which were derived from Mustagh-ata.

During this time I thrice attempted to reach the summit of Mustagh-ata, but without success. I had previously made an attempt in April, but on that occasion we were assailed by a blizzard of snow at a height of 18,000 feet. On August 6 I climbed to 19,400 feet, but was then stopped by the unfavourable nature of the ground, which was covered with huge snowdrifts just ready to fall as avalanches. On both occasions we passed to the north of the glacier of Yam-bulak. On the third attempt (August 11) I chose the southern side of the glacier Tyal-tumak. At a height of 18,500 feet we again found ourselves in an extremely dangerous position, where we narrowly escaped losing a Kirghiz and two Yaks that fell into crevices concealed by snow. There is no possibility of reaching the summit by this route, for the great protuberances of ice and the crevasses present obstacles insurmountable even by the most experienced mountaineers.

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* The figures in the manuscript are indistinct.

On August 16 I made the fourth and last attempt from Yam-bulak. As I had found that a single day would not suffice for reaching the summit, I decided to spend the night on the mountain. At 19,400 feet an improvised tent was pitched, and along with five men and eight Yaks I passed a terrible night in the rarefied air, which brought on severe attacks of mountain sickness. Next day a violent blizzard of snow forced us to return with all possible speed. We were half dead in the morning, and, even had the weather been favourable, I scarcely think we should have been able to reach the summit. It must be noted, too, that the slope of Yam-bulak does not lead to the principal summit. There are three peaks, the middle one being the true summit; but in my opinion it is quite inaccessible, not from its height, but from the nature of the ice. The northern summit should be accessible from Yambulak—at least, I did not observe anything unsurmountable. This peak is about 1000 feet lower than the middle one, which is about 25,000 feet. I hope some one will visit Mustagh-ata in a few years. It would be of great interest to observe the changes in the condition of the ice and the movements of the glaciers, which will have taken place by that time. But it will be absolutely necessary to make measurements of scrupulous accuracy, without which it would be impossible to come to any conclusions as to the climatic variations which had caused these changes. Bogdanovich visited the front of the Yam-bulak glacier and determined its height fifteen years ago, and I found his observations of great importance.

It is interesting to note that the lower parts of Mustagh-ata, on the north and south sides, bear the famous name of Kara-Koram. The word *koram*, or rather *goram*, signifies "stony ground."

On August 19 I visited the Russian fortress of Murghab, to replenish my stock of provisions. From there I made an excursion to Basar-dere, the Alichur-Pamir, and Yashil-Kul, a lake formed in the same manner as Little Kara-Kul. I returned to Murghab by the Neza-tash pass, and proceeded thence to Sarik-Kol by the Sarik-tash pass.

From September 16 to 26 I examined the south-west, south, and south-east slopes of the mountain; thence returned to Kara-Kul and spent ten days there, taking the soundings of which I have already spoken. For our return to Kashgar I chose the difficult pass of Merke-bel, across a glacier nearly a mile wide, and after traversing the valleys of Merke and Chats arrived at my destination on October 19.

In addition to the observations already described, I obtained 170 specimens of rock, chiefly volcanic, a collection of plants from the slopes of Mustagh-ata and of algæ from Kara-Kul and Bassik-Kul, and a fine collection of sketches and profiles of the glaciers. I am consequently not at all sorry to have changed my original plan of going straight to Lob-Nor. The suffocating heat of summer forced me to turn to the mountains. Throughout I was the only European, and I had none but Kirghiz servants and a Sart of Osh. I made some interesting observations on the migrations of the Kirghiz with the seasons.

I have excellent meteorological, hypsometrical, and topographical instruments, a theodolite by Pistor, a chronometer by Frodsham (8873), which was with Nordenskiöld on his voyage in the *Vega*, another chronometer by Wirén (154), two sets of photographic apparatus (Watson and Eastman) with 1000 plates remaining, craniometers, three guns, with plenty of ammunition, etc.

The fatigue of the past four months obliges me to remain for some weeks at Kashgar to rest, but I shall start for Lob-Nor on an early day in December. My intention is to follow the Tarim as far as the lake, and to try to find the true Lob of the Chinese maps, which Baron von Richthofen has admirably shown must undoubtedly exist. There are many important problems to be found in the Tarim desert, especially those relating to hydrography and archæology.

The expedition to Lob will require four months, and then I shall return probably by Cherchen and Nia to Kashgar. I cannot yet decide by what route to endeavour to enter Tibet; I should like to go by Kangut, but I have not obtained a permit. The ancient route by Kara-Koram is well known, so I must consider the matter further. I have decided not to think of Lhasa at all. It would certainly be a most interesting journey, but of little scientific value. There will always be tourists ready to attempt this adventurous journey. The object of my future research will be the geology of the Kuen-lun range. Above all, I intend to search for traces of the migrations of the Ugurs to Alashan and the southern parts of Gobi. Much remains to be done in Central Asia, and it is a great pity that the modern traveller who journeys for pleasure alone, and has had no scientific training, should not take a scientific man with him, who could give an exact account of the nature of the country traversed from his personal observations.

ADMIRAL BRINE'S 'AMONGST AMERICAN INDIANS.'*

By CLEMENTS R. MARKHAM, C.B., F.R.S.

ADMIRAL LINDESAY BRINE, already well known as the author of the 'Taeping Rebellion in China,' visited America to investigate the mounds and defensive earthworks of Ohio, and the principal ruins of Central America, in 1869. His professional and other duties have delayed the publication of his work, but the interval has enabled him to study the results of subsequent investigations, and the gallant admiral may now be congratulated on the appearance of a valuable as well as a pleasantly written book.

Admiral Brine examined the two largest mounds in Ohio, those of Miamisburgh and Grave Creek, as well as the remarkable defensive works, including Fort Ancient, of all of which he gives careful and interesting descriptions. He is unable to believe that the earthworks in exact geometric shapes can be the work of the aborigines, and is inclined to attribute them to some very early Spanish or French adventurers. But the mounds and some of the defensive works are undoubtedly of native origin, though their age and their builders are difficult and perplexing questions. There is no reason to suppose that the aboriginal inhabitants of the Ohio valley were ever in a much higher state of civilization than they were when they first became known to Europeans; yet the Delaware Indians of the last century only knew of the mound-builders as a distinct people from themselves called Tallegwi, who, in the far-off times, went away south down the valley of the Mississippi, and never returned. Admiral Brine, after comparing the mounds of Ohio with similar works in Guatemala, arrives at the conclusion that the Tallegwi invaded and conquered the Central American region, and were, in fact, identical with the Toltecs who built the temples in Chiapas and Yucatan. It is certain that the Ohio conquerors, if they really extended their migrations so far, brought no knowledge of sculpture or architecture with them. But there is authority for the belief that the chiefs of the Quiché-Toltecs formed a perfectly distinct caste from the people they enslaved, a fact which points to conquest by invaders at some early period.

The Delaware tradition may, however, point to some movement of much less importance. The mound-builders of Ohio are believed, on good grounds, to have been an agricultural race. Mr. Shaler has suggested that it was the coming of the buffalo into the Ohio valley, affording food without labour, that debased the mound-builders from agriculturists to hunters. On this hypothesis, the aboriginal inhabitants, in their mound-building period, were more advanced than their hunting descendants, though the same people.

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* 'Travels amongst American Indians, their ancient earthworks and temples,' by Vice-Admiral Lindesay Brine (Sampson Low & Co., 1894).

From the mound-builders of Ohio the author takes us, in several very pleasantly written chapters on the prairies and the far West, to Central America, where he had opportunities of visiting and studying some of the famous ruins, including Patinamit, Utatlan, Palenque, and Uxmal. Although this field of research has been well worked both before and since, yet the admiral's descriptions and reflections are fresh and interesting, and his book is a welcome addition to the literature of the subject. After very carefully examining the ruins at Palenque, he went on to Uxmal, in Yucatan, and by comparing the two styles he was able to estimate their relative antiquity. At Palenque the temples are built of compact stone and mortar covered with cement, with many human figures of stucco, or graven on slabs. At Uxmal the walls are faced with well-worked masonry, with no coatings of cement and no figures. He concludes that Uxmal is more modern than Palenque, the flourishing period of the latter being from about the eighth to the fourteenth century. Palenque has the advantage of a magnificent site. The ruins stand on heights which form the foothills of the Sierra beyond, with a broad view over the forest-covered plain below, away to the waters of the gulf. The ruins have been restored in imagination by the artistic skill of Viollet-le-Duc, and also in Bancroft's work.

The centre of interest, from Admiral Brine's point of view, is the so-called "Temple of the Cross" at Palenque. The altar tablet is 6 feet 4 inches by 10 feet 8 inches, with inscriptions at the sides. In the centre is the figure supposed to be a cross surmounted by the *quetzal*, or sacred bird. On either side there is a man, well drawn and clothed. That on the right offers something resembling a new-born child to the quetzal, while that on the left is smaller. Admiral Brine holds that the figure on the right is not a priest, but a Quiché chief clothed in the dress described by Juarros. Unable to come to the conclusion that the artistic skill of the people who conceived and executed these sculptures and architectural works was of indigenous growth, Admiral Brine turns to Europe for a solution of the problem. The supposed cross, on which the sacred bird is perched, points, he is inclined to think, to the East; and he suggests that Antilia and the seven cities founded by seven bishops from the kingdom of Don Roderick may be something more than a myth. He quotes the very same passage from Galvano on which Mr. Yule Oldham also relies to support his pre-Columbian Portuguese voyage to America. But if there was any residue of truth in the myth of Antilia's seven cities, there must of necessity have been return voyages to bring back the tale concerning them, and this is not suggested. The general drift of opinion, based on the scientific study of American archæological remains, is certainly in the direction of an exceedingly remote origin for the red race, and of indigenous development. The solution of these problems is no longer sought from Manchurians or Malays, or even from Don Roderick's bishops. The builders of ancient times, on the American continent, whether of the mounds in Ohio, of the pueblos in New Mexico, of Palenque and Uxmal, or of Sacsahuaman and Tiahuanacu, probably developed their art by slow degrees, in their own way, and without foreign help. But these are doubtful questions which will require much more research and study before solutions can be reached; and meanwhile Admiral Brine's contribution to the literature of early American civilization is very welcome. It is the work of a painstaking, conscientious investigator, who has carefully weighed the evidence at his disposal, and has arrived at his conclusions after very comprehensive study. Apart from its antiquarian value, the admiral's work forms an agreeable and pleasantly written book of travels.

MRS. BISHOP IN KOREA, CHINA, AND RUSSIAN MANCHURIA.

[The following letter has been received at the Society from Mrs. Bishop:—]

British Legation, Peking, October 5, 1894.

I think that it is about time that I should give some account of myself. My former letter was sent by my boatmen from Nungchyon to Seul after my five weeks of successful travel on the south branch of the Han. I think I wrote of an accident in a rapid, in which I lost many of my notes and nearly all my negatives taken on the Han.

I went up the north branch of the Han afterwards as far as it was possible to pole and drag a sampon. Returning 30 miles to Nungchyon, I took ponies and went for a week to the Diamond mountain, partly taking Mr. Campbell's route, partly Mr. Curzon's, and partly a new one, returning inland. I then went nearly due east, and crossed a most remarkable pass 4100 feet in altitude, "the Pass of the 99 turns," which descends abruptly on the sea, kept to the coast for 50 miles, turned west to Ampien and Namson, and from thence reached Jenson by the high-road, having spent a very successful and on the whole pleasant two months. At Jenson I left all my travelling-gear, intending to return after the rainy season and continue my journey to the Tumen and Russian Manchuria. The war maimed my plan, and left me with a mutilated half. I reached Chemulpo on June 21 by steamer, intending to go up to Seul, get my money and my luggage, and in a few days go to Japan for the summer. I found Chemulpo occupied by the Japanese, and I was ordered away that night, not into a position of security, but actually into the lion's mouth, *i.e.* on board a Japanese steamer, which sailed that night for ports in the Gulf of Pechili. I was penniless and had only the clothes I wore, and in this state reached Chefu, where the Consul provided me with money, and the wives of the British and Spanish ministers made up a bundle of clothing. On their kindness I subsisted through the long hot summer, for I only got my money and luggage on September 10, and have still $600 in Seul.

After rolling for some days on the muddy Pechili waves, the captain expecting daily to be made a prize, he decided to go to Newchwang, where we found that the Chemulpo scare had been baseless. I was not then in circumstances to go to Japan, and after a pleasant week at that dreariest and kindliest of ports, I took a "been boat" for the week's voyage to Mukden, my friends not realizing what the result would be of five days and nights of incessant rain. The following day the rain began again, and we were soon entangled in the torrents and currents of the vast inundation 8 feet deep, which has turned the magnificent plain of Manchuria into a malarious inland sea. I saw the destruction of over thirty prosperous villages, and had the happiness of saving some lives. But the storm of wind and rain and the darkness were terrific. I was ill, and lay on my camp-bed for three days in soaked bedding and clothing, the mat-roof of the junk letting in the rain everywhere, and I was so weak when we reached the landing for Mukden that I was lifted into the cart. I have suffered ever since from the effects of malaria and exposure to chill. Just within sight of the house of Dr. Ross at Mukden, the cart overturned, and with the shaft mule rolled down a declivity, and I into the roof and broke my right arm, which, after being in splints and a sling for six weeks, emerged usable, though weak. With this my misfortunes ended. I know now how to appreciate a luxurious room, a good bed, most excellent nursing, and all the luxuries and comforts of carefully tended illness; and my arm was much less painful than I thought a fracture accompanied by a complete smash of the tissues would be.

I spent more than six weeks in Mukden, and was fascinated by it, and had singularly good opportunities of learning much of the inner life and opinions of the upper, *i.e.* the official, class. After the army began to march to Korea, and specially when the undisciplined Manchu troops began to pass through Mukden, great "troubles" began. Mr. Wylie, a Scotch missionary, was beaten to death, and the populace, incited by the soldiers, demanded the lives of the foreigners. I left at a time when it was regarded as a great risk to go the 3 miles to the river, but was quite unmolested, and reached Newchwang after a most pleasant trip, not knowing that I escaped by one hour from an outbreak of piracy and murder, in which my boat was one of those marked for attack. After a week at Chefu and another at Tientsin, where the scare among foreigners was tremendous—if so big a word may be applied to a fright, or state of fear, which appears to me to be without foundation—I came up here, somewhat, or rather much, against the wish of the English minister and consul, who only gave me the pass because they said I had won a reputation for being "the most prudent of travellers"!

In the five days in a solitary house-boat on the Peiho and on the canal from thence here, I met with nothing perilous or disagreeable, and for a fortnight I have gone about freely here on foot and in a mule-cart, with only my faithful Chinese servant, without encountering hostility or rudeness anywhere, even though I have taken many photographs with my tripod camera. I am the guest, in the absence of Mr. O'Conor, of the secretaries of the English Legation, and have had a very delightful time. Mr. F. Campbell and Mr. Grant Duff are of our "mess." The scare here is fearful, and again I think without reason, and I know the utmost that can be said in its favour. A popular rising against foreigners and a massacre are apprehended, events that I feel sure will not occur so long as the present Government retains a scrap of power, for the interests of its Tartar troops are identical with those of the dynasty. To-night I read a paper for the Oriental Society of Peking (of which I have been elected an honorary member) in the glorious Hall of Dragons in this Legation, to an audience consisting of the whole diplomatic body, the officers of the Chinese customs, and the professors in the Imperial College, and never found people kinder or more sympathetic.

You will see from my story that, owing to the war, I have done very little geographical work, and, except in Central Korea, have not been off the beaten, though not the "globe-trotters'" track. I am purposing to return to England in April, but the fascination which has drawn me six times to the East has increased rather than diminished. Korea is the most uninteresting country I have travelled in. The people seem the dregs of a race. But I think that too much has been made of its difficulties. There is nothing to daunt or especially repel an experienced traveller except the *hot floors!* China is infinitely worse.

Krasnoye Frontier Military Post, Tumen R., Russian Manchuria,
November 24, 1894.

I will add a postcript. Having suffered for four months from malarial illness, I came up to Vladivostock three weeks ago to try the specific of a complete change of climate, which has been so successful that I am now able to do a little rough—very rough—travelling. I also wanted an opportunity of seeing whether Koreans are capable of improvement in better circumstances than those of their own country. I have been up to Hunchun, on the Chinese frontier, and then came down to this post, where three empires meet, purposing to get over the Tumen into Korea; but I have been absolutely baffled, for the first time on any journey, and this though I have been helped by the whole military strength of Russia on her Korean frontier. It is, in fact, too late in the season, but the *coup de grace* to my project has been given by what the

Americans call "the cussedness" of my Siberian ponies. English papers have asserted that Russia "has massed 5000 men on the Tumen river," and this has reappeared in the Anglo-Chinese papers. I have been along the whole Tumen frontier, and there are just *fifteen* men, the garrison at the mud hovel from which I now write. The winter is closing in early. I have already been able to cross the head of Possiet Bay on the ice, but the rivers are in a half-and-half state, and will not be passable till after the time at which the latest steamer leaves for the south. I hope, however, to reach the Usuri by travelling along the Trans-Siberian railroad as far as waggons can go over it. Nothing can exceed the courtesy and hospitality which I have received, ever since I landed, from Russian, civil and military, officials. They have helped me in every way, and, far from showing a tendency to conceal anything, they have offered and supplied information on every point in which I am interested, and have shown me everything, with full permission to photograph whatever I like. I have never been asked for my passport. The military governor of Vladivostock gave me letters to the Frontier Commissioner and others which have been of very great service, and as to the hospitality it is something wonderful. But the story of unbounded kindness and helpfulness is the "old, old story" which every *bonâ fide* traveller has to tell.

I am purposing—I cannot say hoping—to return to England in April by the Red Sea.

DR. TEN KATE'S TRAVELS IN THE INDIAN ARCHIPELAGO.

THE *Tijdschrift* of the Royal Dutch Geographical Society has recently published the illustrated report of Dr. H. Ten Kate on his travels in the Indian Archipelago and Polynesia. This traveller, who had previously made explorations in North and South America, Lapland, etc., was commissioned in 1890 by said Society, and returned to Holland towards the middle of 1893 by way of Australia and Argentina, in which latter country he made a prolonged stay.

The chief object of his investigations was man, anthropologically and ethnologically, although due attention was also paid to natural history and geography in general. Besides Java, Celebes, and other islands, where Dr. Ten Kate made short stays in passing by, the region covered by his explorations was specially the group of Timor, including Timor itself, Samau, Flores, Solor, Adunara, Sumba or Sandalwood, Roti, and Savu. Although some of these islands had been visited by former and recent travellers, physical anthropology remained a desideratum, and many points in their ethnology had to be investigated more thoroughly. Sumba was, in most respects, a *terra incognita*, and about certain regions in Timor and Flores, as, for instance, Belo and Lio, very little was known.

In Sumba, Dr. Ten Kate visited a part of the south-east and the centre of the island, where until then no white man had been. In Lio (Flores) a Catholic priest, Le Cocq d'Armandville, had been for the first time, and Dr. Ten Kate was the second European who went there in his company. In Belo (Central Timor) Ten Kate's farthest point had only been visited by a Dutch Government official, Mr. Kleian.

The following are some of the principal results obtained by Dr. Ten Kate in the Timor group.

All the inhabitants of the different islands explored by Dr. Ten Kate are more or less mixed with Melanesian blood, either Papuan or Negrito, except the Sumbanese. In Savu the Melanesian element is also very scarce. The purest Melanesians were found by him in the village of Hokor, north-east of Sika, Flores, and at Koting, Gehar, and other villages on the isthmus which separates Sika from Maumeri on the same island. Very numerous anthropometric data and a number of skulls were collected among these various peoples, on which subject the traveller is preparing a paper for the press now.

The main results of his ethnological investigations are to be found in his important collections, now in the National Museum at Leiden. Many objects are new to science, and of a great number of others the museum did not possess a single specimen. Ten Kate's collection shows at the same time the parallels and differences between the handicraft, taste, etc., of these various peoples, and throws a new light upon the geographical distribution of certain objects, as, for instance, the wooden pillow, the mask, the blowpipe, the bow, the lance, shell ornaments, etc. But besides this collection, new observations have been made concerning sociology, religious beliefs and practices, psychology, funerary customs, dwellings, toys for children, arrow release, etc., of all these islanders. The first exact description of the megalithic funerary monuments on the island of Sumba, and the finding of Chinese pottery in these graves, is certainly one of the most important points in Dr. Ten Kate's report.

As far as zoology is concerned, the fauna of Sumba was, with the exception of birds and lepidoptera, entirely unknown. The collections and observations made by the traveller have largely added to our knowledge in that respect. About the other islands Mr. Ten Kate also made some interesting discoveries. He found again, for instance, the tiger-cat of Timor, of which the last and only specimen had been seen more than sixty years ago. He afterwards proved the existence of the same animal on the peninsula of Landu, Roti.

Geologically, the collections made by the explorer have largely contributed to our knowledge of West and Central Timor and the island of Samau. The fact that the Triassic formation (upper alpine) was found by Mr. Ten Kate in Central Timor, deserves to be specially mentioned. The geology of Sumba was absolutely unknown. Ten Kate's collections and observations have shown that probably the whole island is composed of coral rock, limestone, and marl. This last formation has furnished the first elements for the study of sub-fossil foraminifera, which it contains in such enormous quantity, and the study of which was a desideratum as yet for the Indian Archipelago.

As far as the geography is concerned, the principal of Dr. Ten Kate's results may be mentioned here. He was the first explorer who ascended the Lakân, the highest mountain in Central Timor. He gave it the name of Mount Reedtz Thott, and found the altitude to be 6396 English feet. The whole mountain was composed of amphibolite, as shown by Professor Wichmann, after specimens collected by Ten Kate. Another result of this ascension was a better knowledge of the surrounding country. The doctor showed, for example, that Mount Allas, or Alas, which is found on the best charts, does not exist, but most probably must be identified with Mount Kabalaki in Portuguese Timor. The non-existence of a "volcano" on the south coast of Sumba was also shown by the traveller, notwithstanding the fact that it is found on the newest charts. As the regions visited in the south-east and south-centre of Sumba were entirely unknown, all the data he gives in his report on that subject are quite new. A sketch-map of the island of Sumba, also published in the *Tijdschrift*, shows the various itineraries of Dr. Ten Kate, and brings many new names of villages, mountains, rivers, etc.

Of the northern part of the island of Roti, the peninsula of Landu, little was known. Dr. Ten Kate has brought several new data concerning it, particularly about the salt lake called Tasi Poko, which lies in the interior.

THE MONTHLY RECORD.

THE SOCIETY.

Mr. Mackinder's Lectures. — The President, Mr. Clements R. Markham, was requested by the London Society for the Extension of University Teaching to act as examiner on the first series of Mr. H. J. Mackinder's lectures at Gresham College, on "The History of Geography and Geographical Discovery." Mr. Markham's report is as follows: "These examination papers show that nearly all the candidates have acquired a fair knowledge of the subject which has been chosen by them for special study, and a fair percentage evidently possess a good deal more than a mere superficial knowledge. They all show that attention has been given to the lectures, and that an intelligent interest has been taken in them. Some few of the papers show even more than this. There is evidence in them of a successful endeavour to form broad conceptions of the course and tendency of events from the information supplied; and in several cases illustrations are given which show that the students came to the lectures already provided with some knowledge of the subjects discussed. This seems to be a very great advantage, and of course enables the students to derive increased benefit from attending the course. . . . The examiner, in conclusion, takes this opportunity of expressing his opinion, based on a perusal of the papers, that these courses of lectures on geography are likely to be productive of good, by stimulating an interest in a subject which could not be so well studied in any other way by persons in the position of these young students. The expression of a hope may be permitted that such instruction in London may eventually be placed on a permanent basis." The second series was begun on Monday, January 21, when the President, Mr. Markham, occupied the chair.

The Christmas Lectures.—Dr. H. R. Mill gave, in the end of December and beginning of January, a course of four Christmas lectures to young people in the Map-room. The subject was "Holiday Geography," and the aim of the course was to bring the brighter and more attractive aspects of geography into prominence, and to show how much a little knowledge of geographical principles and methods could add to the enjoyment of a holiday in the country or in a foreign land. The first lecture was devoted to maps as holiday companions, and showed the importance of learning to read and interpret maps in order to get the full benefit of their companionship on a solitary walk or bicycle ride. In the second lecture the nature and uses of geographical pictures were explained. A geographical picture was defined as one that is both characteristic and representative of a special region, taking account either of the land-forms, the vegetation, commercial products, dwellings, means of transport, or the people of the country. Such pictures combined with maps would enable a stranger to form a true and vivid impression of a country he had never seen, and the selection of proper subjects and view-points lend a new charm to amateur photography. The last two lectures were practical applications of the principles laid down in the first two. By means of maps and pictures, shown by the use of two optical lanterns on two screens placed side by side so as to permit of comparison, the geography of the English Lake district and of several alpine valleys in the Tyrol was graphically presented. The lectures were illustrated by more than 300 slides, which were specially prepared, many of them from photographs taken for this course of lectures. An exercise was set at the first lecture, and the prize offered by the lecturer for the best map drawn in contour-lines on a sheet, simply bearing figures of height and depth, was gained by the daughter of a lady Fellow.

EUROPE.

Inland Navigation in France.—A report drawn up by Mr. C. Hardinge upon the recent development of canal traffic in France, illustrated with a map, has recently been issued (Foreign Office, 1894, Miscellaneous Series, No. 342). The report commences with a sketch of the early history of the canal system, followed by an account of the development of canal traffic during the seventeenth, eighteenth, and nineteenth centuries. The system of canals in France in the year

1892 comprised 12,396 kiloms. (7747 miles) of rivers and canals open to inland navigation. Previous to 1879 navigation on canals was confined to local transport, on account of the great diversity of local conditions in different parts of the country. Now, however, owing to the improvement of the canals and locks, a barge of 300 tons can navigate direct from Havre to the frontier of Alsace (514 miles), or from Dunkirk to Lyons (687 miles). There is a considerable international canal traffic on the north-eastern frontier of France, the canals linking the Scheldt, Lys, Sambre, and the Meuse being connected with the Belgian system of inland waterways, while the canals connecting the Moselle and the Maine to the Rhine, and the Rhone to the Rhine, serve as a means of communication with Germany by inland water. The greater part of this international traffic is with Belgium, of which two-thirds are the importation of coals from the coal districts of Mons and Charleroi. There are still, however, many improvements to be completed on the canals in Bourbonnais and Burgundy. The canal from the Maine to the Saône, and that from the Saône to the Doubs, are at present unfinished, and the extension of navigation on the Rhone awaits the construction of a canal to Marseilles.

Plan of Odessa.—An excellent plan of Odessa, on the scale of 1400 feet to the inch, made in 1894 by M. Dieterichs, and detailed maps of the township of Odessa, with the surrounding *limans*, on the scale of 1 : 42,000, are given in the last issue of the *Memoirs* (*Zapiski*) of the Novorossian Society of Naturalists in Odessa (vol. xviii. 2, 1894), in connection with a paper by Prof. Sintsoff on the water-supply of that city.

ASIA.

Mr. Bent's Expedition to Southern Arabia.—A letter has been received at the Society from Mr. Theodore Bent, dated Muskat, December 11, from which we regret to learn that he has been compelled to give up his project of crossing the desert to Aden. He finds that the party would be twenty-five days without water; an Arab who crossed nearly lost his life. Mr. and Mrs. Bent, with their party, intended to start in a few days for Jofar, on the south coast, and make their way thence to the eastern end of the Hadramut valley, and so complete the exploration of that region. Mr. Imam Sharif had been ill, and so the departure was delayed. Mr. and Mrs. Bent were received in the most friendly way by the Sultan and the British resident at Muskat.

A Recent Visit to Mecca.—At the meeting of the Paris Geographical Society on December 7 last (*Comptes Rendus*, 1894, p. 463), M. Gervais Courtellemont gave a sketch of his visit to Mecca, lately made in execution of a mission entrusted to him by the Governor-General of Algeria. M. Courtellement, who is the author of a series of illustrated works on Mussulman countries, gladly availed himself of this opportunity of becoming acquainted with the centre of the Mohammedan world. He is only the second Frenchman who has visited Mecca and returned in safety. The journey was made, in company with a faithful Algerian attendant named Haj Akli, in the guise of a pilgrim, a new convert to the faith, subject to all the hardships attendant on such a profession. Although looked upon with much suspicion at Jidda, by hurrying his departure the traveller reached his goal in safety, mounted nearly naked on a donkey, with head shaven and bare, having suffered intensely from the cold by night. On arrival he performed the various ceremonies required of the faithful, becoming a guest of the *metuf* of the Algerians, the functionary who supervises the prayers of the pilgrims, and serves generally as guide during their stay. M. Courtellement displayed before the meeting some photographic views which he was able to take in Mecca, and gave details as to its political and commercial relations, and the manners of its inhabitants.

West Borneo.—M. Maurice Chaper contributes to a recent number of the *Annales de Géographie* some notes on a recent voyage to Borneo, undertaken for industrial and scientific purposes. He visited the western part of the island (Wester Afdeeling), and ascended the Kapœas for 400 miles. It is a narrow winding river, bordered by magnificent nipas (*Nipa fruticans*) forming a dense hedge, beyond which lies the flat and muddy area of the delta. A numerous population lives by fishing and cultivating rice and bananas. The coconut palm abounds, but the vegetation is ill adapted to animal life, which is conspicuously absent. Pontianak, at the confluence of the Landak and the Lesser Kapœas, the capital of the Wester Afdeeling, has a large import trade, especially in rice, which cannot be grown owing to the barren clay soil and the double danger of drought and inundation. The same pale yellow clay covers the greater part of the basin above Sintang, the second town, at the junction with the Melawi. A small river, the Penindoe, presented a striking contrast, with magnificent forests, luxuriant vegetation, and orchids in splendid profusion. The Dyaks have suffered by contact with Europeans, who have acquainted them with vices and diseases previously unknown. Much land has passed from cultivation, industrial arts have retrograded, and the population is fast diminishing. It is difficult to say how far the basin of the Kapœas is typical of Borneo. The north and north-west are probably more capable of exploitation, as tobacco, sugar, and pepper grow well, and Sarawak also possesses coal. The trade in gutta-percha needs careful superintendence, as the tree is disappearing in consequence of the reckless methods employed. The productive zone is roughly indicated by a line drawn from Pontianak, following the ridge between the Kapœas and the Landak, joining the crest of the Batang-Lœpar range, and crossing the Kapœas highlands in an unknown direction.

AFRICA.

Mr. Weld Blundell in the Cyrenaïca.—The following letter, dated "Fountain of Apollo, Cyrene, Dec. 4, 1894," has been received from Mr. H. Weld Blundell:—"I have experienced great good luck in this journey, especially in falling on a sensible and straightforward Pasha of the district. I had no obstruction or official difficulties of any sort, and am comfortably settled here, a few yards from the classical spring of Apollo at Cyrene, after a most delightful journey through the Cyrenaïca. The rhapsodies of former travellers scarcely do justice to it. It is like a ten days' ride through the Malvern Hills and Shropshire, if you could imagine all the evidence of human beings in the way of buildings, etc., removed, and arbutus, laurustinus, and juniper, etc., instead of oaks and elms. Stretches of beautifully fertile plains, with rich red soil covered with flowers and shrubs, and well-sheltered valleys and glades of fine short grass, not like the ordinary coarse growth of the tropics, but like an old pasture, and even a lawn-tennis ground! There are whole square miles like an English park, and one almost expects to see a head-gardener appear to warn you off the grass. In spite of this, I do not think that, with the exception of a little village called Merj (ancient Barka) and this place, I have seen fifty inhabitants in the whole journey from Benghasi. The climate is now like a fine September in Scotland, but, of course, drier, and the sun at midday is, of course, hotter. We are just under 2000 feet above sea-level, and have a grand view over the ancient road from Apollonia over a rich green plain of the terrace below us, whence the road descends by a sharp incline to the sea, which stretches away before us to the north and north-east. I hope to be some time here, and visit the important points along the coast. Possibly I may be able to get inland."

Russian Expedition to Abyssinia.—The Russian Geographical Society has sent out an expedition to Abyssinia and the surrounding regions, which is now on its way. It consists of A. K. Léontief, who has supplied the chief means for the expedition; the well-known traveller, Dr. Eliséeff, who undertakes to make natural history observations and collections; the artillery officer, Zvyaghin, who will make the astronomical observations and do topographical work; M. Agapoff, a naturalist from the museum of the Academy of Sciences; and the Abyssinian, Rass-Lig Rerd, acting as an interpreter. The expedition will proceed, *viâ* Suez, to Obok, where a caravan will be organized to journey across the desert to Ankober and Antoto, thence into the highlands of Northern Abyssinia, and, if possible, into the Sudan. It is proposed to spend two years in these journeys.

Exploration of Mount Mlanji, Shiré Highlands.—Mr. Alfred Sharpe, acting commissioner in Nyasaland, has communicated to the Foreign Office the account of an exploration of Mount Mlanji, which has also been described by Captain Manning, one of the party who accompanied him, in the *British Central Africa Gazette* for November 24th last. Although the south-western plateau was already well known, and promising to speedily become the site of a flourishing settlement, the rest of the range, especially its north-eastern half, had previously been little known. It was on this side that the ascent was made from Fort Lister. A striking feature of the mountain on this, as well as the south-western side, is the existence of an outer ledge, 6000 feet above sea-level, or 3000 feet above Fort Lister, separated by a ridge 8000 feet high from the main north-eastern plateau. The latter contains the sources of the Ruo river, which extend so far to the north (being separated only by a few yards of level ground from those of the Likulezi) as practically to cut the mountain in two. This north-eastern plateau—entirely separated from the south-western by a succession of high rocky peaks with deep gorges between—is described as a grim-looking spot, surrounded with towering walls of bare granite, of which the eastern extension of the mountain appears entirely composed. The grass in the lower valleys was delightfully green, and the plateau should, Captain Manning says, be an ideal sheep farm or cattle ranch. The route hence was continued by an exceedingly difficult pass through a gorge between the central peaks, and after some extraordinary feats of climbing, often in thick mist, the last rocky pinnacle of the highest peak was reached, 9680 feet above sea-level. Thence a descent was made by an easier route to the south-western plateau, of the advantages of which, for a sanatorium, Captain Manning speaks in high terms. Forests of the Mlanji cypress (*Widdringtonia Whytei*), which is peculiar to the mountain, were met with in many parts of the higher regions, and there are indications that at one time the whole mountain above 6000 feet was covered with them; but their extent has been gradually diminished by the grass fires, so that they are now in parts limited to the gorges. Mr. Sharpe remarks on the necessity of taking steps for the protection of these groves, which supply a most valuable timber, for the utilization of which he has started saw-pits at Fort Lister. A good road has recently been made across the plains to the station from Zomba, and the distance can now be done, if necessary, in one day. There is no population in the intervening tract, in which water is somewhat scarce in the dry season.

The Flora of Usambara.—Among the scientific researches carried out in recent years by the Germans in their various African protectorates, those into the Botany of East Africa by the late Carl Holst deserve special mention for the value of their results. In the desire to gain a knowledge of Africa at first hand, this energetic collector entered the service of the German Missionary Society, acting for some time as gardener at the station of Hohenfriedeberg, in Usambara, and afterwards became collector for the Berlin Botanical Museum. The care with which he carried out his instructions in recording the needed information as to the *habitat* and conditions of growth of the individual species give an additional value to his collections, which number in all about 4600 plants. These have been dealt with in Berlin by various botanists, and the results published from time to time in Engler's Botanical Year-book. Two more general summaries of the results in special directions have lately appeared, one a treatise by Prof. Engler himself on the subdivision of Usambara into separate Botanical Regions (published in a separate form by the Berlin Academy of Sciences), the other an account of the cultivated plants of the same country, by Dr. O. Warburg (*Mitt. aus d. Deutschen Schutzgeb.*, 1894, p. 131). The former, after noticing some of the main generalizations as to botanical distribution in Africa, which our limited knowledge of its flora allows us at present to make, and showing the importance which attached to the discovery of the affinities, both of the forest and upper mountain flora of Usambara, proceeds to discuss the considerations of soil, altitude, character, and degree of denseness of the vegetable covering which should determine the subdivision into botanical regions or "formations." Of these he defines eight in the district dealt with, viz. the shore and creek-zones (the latter recent limestone), the bush-land of Jurassic limestone, the "Nyika" steppe, the broken bush-steppe lying before the mountains, the tropical mountain forest, the higher tracts almost devoid of trees, and lastly the upper mountain forest, occurring higher than 5500 feet. Prof. Engler analyzes the constituents of the flora of each of these regions (which are again subdivided according to the particular characteristics of individual areas), and draws the following general conclusions. The first zone shows an agreement with the shores of the Indian Ocean generally. The second, while also possessing some forms in common with the shores of Tropical Asia, belongs in the main, like the next three zones, to the region of steppes and savannahs, interspersed with bush, which occupies so much of the continent from Senegambia to Abyssinia, and thence to South Africa, encircling the Congo basin westwards as far as Angola. The seventh and eighth zones show much affinity with the Abyssinian uplands, while the sixth, or zone of tropical forest, though including some savannah species, in the main is allied, not to North, South, or East Africa, but to the tropical forests of West Africa from the Senegal to the Congo. In view of the undoubted uniformity observable in the African tropical forests in various parts of the continent, Prof. Engler is of opinion that the forest, rather than the steppe flora, had a former greater extension, there being in East Africa a greater area favourable to its growth, while the ancient tableland possessed a greater continuity, and presented a larger surface to the sea-breezes. On its inner border there would always have been a drier zone, which would aid the extension of the Xerophytic flora.—The fact that the Washambaa, or inhabitants of Usambara, are among the most advanced agriculturalists of Central Africa, growing more produce than is needed for their own consumption, gives a special interest to the study of the cultivated plants of their country. Their name even has been connected with the word "shambe" (field or plantation), and so with their proficiency in this respect. In spite of the primitive means employed, they show a considerable knowledge in respect of alternation of crops, the best times for planting and reaping, and the various methods of culture suitable to different crops. They also pay particular attention to irrigation, which enables them to some extent to utilize the dry season for cultivation. Dr. Warburg classes the cultivated plants into thirteen natural groups, beginning with cereals and other food-plants, and coming later to those supplying fibres, dyes, medicinal substances, etc. The result of the detailed examination of these separate groups is to show that the Washambaa possess a really important number of cultivated plants, some of the most important falling under the following heads: cereals, 2 (maize and sorghum); sugar-cane; tuberous plants, 7; pulses, 7; various vegetables, 9; fruits, 6; fibre-yielding plants, 5; besides various others used for condiments, etc. Dr. Warburg thinks that there is still room for improvement in the direction of increased cultivation in the dry season with the help of irrigation, and especially in the early, cooler part of the same, by the introduction of extra-tropical economic plants.

Physical Geography of the Southern Congo Basin.—The Bia-Francqui expedition, the general results of which have already been fully noticed in our pages, has thrown much new light on the geology of the regions traversed, thanks to the investigations of Dr. Cornet, one of its members. The results in this direction are described by him in *Petermann's Mitteilungen* (1894, No. vi.), and illustrated by a sketch-map showing the principal formations represented. Owing to the absence of fossils, these cannot yet be assigned to groups established elsewhere, but can only be classed according to their general petrological characteristics. Of recent surface formations, Dr. Cornet distinguishes (1) the soil formed by the decomposition of rock *in situ*; (2) the deposits at the sides of the valleys, including beds of rolled pebbles and gravel; (3) the alluvium of the valley floors. The first occurs chiefly on the plateaux, and may be considered as analogous to laterite; the second, along the course of the Lualaba; and the third, which includes both the deposits of the yearly inundations, and those formed on the floors of old lakes now drained, is found in various parts of the Lualaba and Lufira valleys. Next in order come two series of conglomerates, etc., in the main horizontal, occupying a large area in the central Congo basin. They consist of sandstones, shales, etc., of various characters, and attain their greatest development on the Lubilash and the Kundelungu plateaux respectively. The more southern parts of the Congo basin are in the main occupied by high lands, composed of much-folded ancient strata, which, along an axis running from north-east to south-west, have been subject to metamorphism, both from the intrusion of eruptive masses and from mechanical movements. This axis divides the ancient rocks into two distinct series (that to the south-east in the basin of the Lufira being the more extensive), each again to be subdivided into separate groups. Eruptive rocks are met with both in the region of the metamorphic axis and in various localities on either side of it, notably on the Luembe and Lubichi, tributaries of the Lubilash. They are mostly granitic in character.—The surface features of a portion of the country traversed by the same expedition, viz. the Samba plateau, at the sources of the Sankuru, Lomami, Luvoi, etc., are described by Lieut. Francqui and Dr. Cornet, in the *Mouvement Géographique* (1894, No. 16). It has a regular, slightly undulated surface, with a sandy soil, in many parts mixed with humus, and gives rise to a remarkable number of streams, which within its limits flow in scarcely marked valleys, these, however, becoming more and more deeply cut as they reach the limits of the region. It is in the main occupied by savannahs, mostly sprinkled with trees of no great size. Its name is that of the race which inhabits it, several of whose villages, of large size, are to be met with on it. The people cultivate much manioc, and rear numbers of goats and poultry. Iron is worked everywhere. Caoutchouc is exported through the Bihé traders. The Samba are great thieves, and seize and sell as slaves all stragglers from caravans which pass through their country, possessing themselves of the goods entrusted to them.

AMERICA.

Geographical Work on the North American Pacific Coast in 1894.[*]—The principal geographical work on the Pacific Coast of the United States during the last season was that executed by four or five parties of the United States Coast and Geodetic Survey in the south-eastern arm of Alaska, in compliance with act of Congress for the determination of the boundary-line between British Columbia and the United States. Necessarily this work has been prosecuted up the principal waterways, as was done in the preceding season. The southernmost party finished its work on the upper part of the Unuk river, a small and torrential stream little frequented, and within 30 miles marked with two deep, narrow canons, very difficult of passage even with the ice-shelves on each side. In summer the Indians make a portage of 3 or 4 miles. When the party had finished its work the ice-shelves were gone, and in the rapid current one of the boats was upset, the instruments lost, and the officer and men barely escaped with their lives. Another party executed the triangulation and topography up the Chilkoot river for a distance of 30 miles. This is now the usual route for miners going into the Yukon valley. Another party executed similar work up the Chilkaht river, and recovered the station of the American total solar eclipse expedition of 1869. The Unuk party operated in the estuary of the Chilkaht, and carried the work to the Seduction Point of Vancouver. It embraced the face of the Davidson glacier, which, coming from between peaks over 6000 feet high, projects far into the deep waters of Lynn Canal with a frontage of 4¾ miles. The great rocky terminal moraine is covered with a heavy growth of firs, which have been broken through in one place within the last few years. Two parties were located at Yakutat Bay; one executed the triangulation towards the base of Mount St. Elias, and the other had an astronomical station at Port Mulgrave, whence chronometers were exchanged with the astronomical station at Chilkaht, and the principal station at Sitka. The triangulation party is the same that determined the latitude and longitude and height of Mount St. Elias; placing that peak in 60° 17′ 34·4″ N. and 140° 55′ 19·6″ W., and the elevation at 18,017 feet. In that triangulation Mount Logan, about 17 miles north-eastward of St. Elias, was placed in latitude 60° 34′ 00·7″ N. and longitude 140° 23′ 48·9″, and the elevation fixed at 19,512 feet. The adjoining peak, about 2 miles distant, has an elevation of 19,276 feet. At Sitka, which has been well connected with San Francisco by telegraph and by chronometers for difference of longitude through many seasons, an astronomical station was established to correct the rates of the chronometers transported by the Coast and Geodetic Survey steamer *Hassler* between Sitka, Chilkaht, and Port Mulgrave in Yakutat Bay. At this station the magnetic elements were also observed, as at every occupation since 1867. Among the Aleutian Islands the United States Fish Commission steamer *Albatross* has made corrections to some of the positions of the western uninhabited islands, and has written up descriptions of some of the outlying rocks for the benefit of navigators. Through Captain Gustave Niebaum, of the Alaska Commercial Company of San Francisco, and Captain Healy, of the United States Revenue steamer *Bear*, arrangements have been made with Alaskan and Siberian chiefs to afford to Lord Dunmore assistance and provisions in his proposed crossing of the strait on ice. Some have doubted the strait being frozen solid in winter, but as the solid ice frequently reaches through Bering Sea to St. Paul Island, there can be no doubt whatever but that Lord Dunmore will find a solid but rough causeway from America to Asia by this route.

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[*] Communicated by Prof. George Davidson, President of the Geographical Society of the Pacific.

The Age of Niagara.—Professor J. W. Spencer sums up the conclusions of his observations on the physical history of Niagara Falls in a short paper in the December 1894 number of the *American Journal of Science*, in which he takes account of the opposed action of erosion by the river and distortion by unequal movements of the land, even venturing to predict the probable order of future changes. He states that "the computation of the age of the Niagara river, based upon the measured rate of recession during forty-eight years; upon the changing descent of the river from 200 to 420 feet and back to 320 feet; and upon the variable discharge of water from that of the Erie basin only, during three-fourths of the life of the river, to afterwards that of all the upper lakes,—leads to the conclusion that the Niagara Falls are 31,000 years old, and the river of 32,000 years' duration; also that the Huron drainage turned from the Ottawa river into Lake Erie less than 8000 years ago. Lastly, if the rate of terrestrial deformation continues as it appears to have done, then in about 5000 years the life of Niagara Falls will cease, by the turning of the waters into the Mississippi. These computations are confirmed by the rate and amount of differential elevation recorded in the deserted beaches. It is further roughly estimated that the lake epoch commenced 50,000 or 60,000 years ago, and there was open water long before the birth of Niagara in even the Ontario basin, and that under no circumstances could there have been any obstruction to the Ontario basin, if even then, later than the end of the Iroquois episode, which has been found to have ended 14,000 years ago."

Lake Superior.—The United States Hydrographic Office has published the first volume of a set of sailing directions for the Great Lakes, dealing with Lake Superior and its approach. Here for the first time we have an official description of this "Brother to the Sea," as an Indian chief named the lake; but greater care in revision would have been desirable—for example, in the same sentence the maximum depth is given as 1008 feet, "but depths have been found as deep as 1386 feet." The navigation of the lake is usually open from the middle of April to the middle of December, when it is closed by ice. The sea-like character of the lake is strongly enforced by the sailing directions. Plans are given of the chief harbours and of the channel and canal on St. Mary's river on the American side, the capacity of which is about to be increased, but no particulars of the new canal on the Canadian side of the river.

POLAR REGIONS.

The Jackson-Harmsworth Expedition.—Mr. Arthur Montefiore writes to us with reference to a paper recently published in the *Comptes Rendus* of the Paris Geographical Society, in which M. Rabot dwells on the present position of the expedition, drawing his facts from a paragraph which appeared in the press in September last. Mr. Montefiore points out that the paragraph was not only misleading in its statements, but has actually been superseded and nullified by later news. This later news, which appeared in the press on October 8, seems to have escaped the notice of M. Rabot and those who have drawn attention in English papers to M. Rabot's paper; and for the sake of placing on record in the *Journal* the latest news received of the expedition, Mr. Montefiore asks us to reprint a paragraph which he communicated to the *Times* of October 8, as follows: "News of the Jackson-Harmsworth Polar Expedition has been brought to England by Mr. J. Russell Jeaffreson, who obtained the information at Thorshavn from the captain of the *Betsy*, a walrus sloop recently returned from her summer voyage in the Barents' Sea. It appears that the captain first saw the steam yacht *Windward* near the well-known Matochkin Schar, where the ice was very heavy, about the middle of August. Returning west towards the end of August, he again met with the vessel in latitude 75° 45′ N., and longitude 44° E.; but on this occasion she was steaming in the direction of Franz-Josef Land without let or hindrance, the ice being in this locality brashy and rotten, the *Windward* actually steaming up a lead of which no termination northward was visible. The captain of the *Betsy*, though unable to distinguish the name of the ship, describes her accurately, and from the positions in which she was seen and the respective dates there is no reason to doubt that his report relates to the *Windward*. It is worth mentioning that this report is precisely what might have been expected, as Mr. Jackson hoped to find a region of loose, brashy ice about 45° to 50° E. long., and, after getting abreast of the Matochkin Schar, intended to make directly for it."

Mr. Burn-Murdoch's Impressions of the Antarctic.—Mr. W. G. Burn-Murdoch, whose finely illustrated account of the voyage of the *Balæna* to the southern ice was recently published,[*] describes in forcible language the rough life and hard work on a sealing cruise; but as an artist he caught the picturesque aspect of even the most uncomfortable experiences. His description of ice-scenery is singularly vivid, and he appears to have been deeply impressed by the importance of Antarctic exploration and attracted by its fascination. We quote without comment the following extracts: "Much to our regret, we had no opportunity at this time of meeting Dr. Campbell of the *Diana*. He, we understand, has been more fortunate than we on the *Balæna*, for Captain Davidson gives him every opportunity of collecting specimens. If we lay hold of glacier rocks or birds' skins we raise a whirlwind of objections, and an endless reiteration of the painfully evident truth that 'this is no' a scientuffic expedeetion.' A most painful state of things this, to see common albatross-skins collected by the score, and rare penguins killed by the hundred, their bodies eaten and their skins chucked overboard" (p. 244). "Would that I owned this ship and this good crew even for three summer months in the Antarctic! Just such a vessel as this could be chartered and fitted out with men, scientists, provisions, and all necessaries for a year's exploration for about £5000. If monetary profit was to be considered, 5 per cent. might be reasonably expected for seal-skins and oil, and, of course, there is the chance of meeting 'Bowheads' worth £3000 apiece. One vessel or two in consort could chart the whole of the unknown Southern Continent. Think of this, ye rich, who dream of knighthood and more riches!" (p. 290).

MATHEMATICAL AND PHYSICAL GEOGRAPHY.

The Percolation of Sea-water.[†]—From his discussion of the material collected during the fourth expedition of the *Pola* in the Eastern Mediterranean, Dr. K. Natterer, the chemist of the expedition, advances an hypothesis of peculiar geographical interest. Some observations on the crusts which in many places cover the mud on the sea-bottom to a thickness of from ½ to 4 inches, as well as the fact disclosed by a large number of analyses that the mud water is neither entirely stagnant nor in free circulation, indicate that as a general rule water is percolating through the capillary pores of the mud, and being sucked in by the underlying rock strata. Besides the slow movements of water-particles caused by diffusion, which takes place upwards and downwards in the mud to nearly the same extent, there is, according to this hypothesis, another movement, always more rapid than the other, but differing in different regions, and always downwards. Fresh quantities of sea-water are thus constantly being drawn into the superficial layers of the mud, and there is no means of carrying away the products of its chemical action. Natterer remarks that such percolation of water through the mud may be assisted by the whole mass of land rising above sea-level, as well as by that actually underlying the sea-floor, as far as the temperature and viscosity of the water permit; and it may be in part due to chemical absorption, also in part to purely mechanical processes. Immense areas round the Mediterranean basin—such as the Sahara—are practically rainless, and in so far as they are connected with that basin by the lie of the geological strata, they may act like a sponge in sucking up water from the sea. A capillary movement of water through the layer between land and water, caused by the joint action of the land itself and of forces acting at its dry surface, must produce many important chemical changes in the substances immediately concerned, as Bischof has assumed, and in part proved to be the case with regard to the drainage of fresh water through sedimentary deposits. According to the rate at which sea-water soaks in and to the nature of the reactions set up, the effects on the land itself must vary, and its influence might be traced in the appearance of petroleum, of exhalations of carbonic acid gas, of sulphuretted hydrogen, and (in deserts) of salt deposits. The meeting of fresh drainage water with the rising sea-water must also give rise to a whole series of reactions, which may, for example, determine the distribution of metallic deposits, or help to fix the ultimate position of meteoric or cosmic dust reaching the Earth's surface. The mingled waters would in most cases—according to Natterer—move towards the Earth's surface, and reach it through springs, from which the return to the sea would be accomplished by streams and rivers. The recognition of an agent of this nature would have great influence in dealing with many geological problems, and Natterer finds proof of the existence of capillary circulation of sea-water in the slow changes of the depths of the sea and the heights of the land. In one place an elevation may be produced by chemical precipitation, in another a depression by dissolving out; land may disappear in the ocean, and a sea-bottom be raised above the waters; and these movements may be accompanied by faulting, displacement, and fracture. [If it be demonstrated, it would confirm the ancient speculation of the Greek physical geographers, who attributed the origin of springs to the sponge-like action of the land in sucking up water from the sea. It is a physical problem, however, whether water raised by capillarity can be delivered at a higher level, except indirectly as a consequence of evaporation.—Ed.]

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[*] 'From Edinburgh to the Antarctic.' An artist's notes and sketches during the Dundee Antarctic Expedition of 1892-93. By W. G. Burn-Murdoch. London: 1894. Longmans, Green & Co.

[†] Communicated by our Vienna correspondent.

The Exploration of the Sea of Marmora.—At the December meeting of the Russian Geographical Society, N. I. Andrusoff read a paper on the submarine explorations made this year by a Russian expedition in the Sea of Marmora, on board the Turkish steamer *Selanik*. It appeared from the soundings that the Sea of Marmora has three separate deep basins, and that, by its salinity and temperature, it is more closely related to the Mediterranean than to the Black Sea. From the geological work of the expedition, it results that the Black Sea was connected with the Mediterranean before the Sea of Marmora had been formed. The latter existed first in the shape of a brackish basin, connected with the Black Sea, but not with the Mediterranean; the latter connection having only been established at a later epoch, probably in consequence of a subsidence of the Ægean area. The formation of the Marmora basin itself is probably due to periodical subsidences of its bottom, which produce the earthquakes visiting this region.

Physical Geography in the University.—In a paper bearing this title in the *Journal of Geology* for 1894, Professor W. M. Davis, of Harvard, gives a powerful exposition of the possibilities of physical geography, and especially the systematic study of land-forms as an intellectual exercise. For this purpose it is necessary, as in all other branches of science, to employ terms with definite and exclusive meanings. Professor Davis has introduced many such terms, with which European geographers require to familiarize themselves before they are able to fully appreciate the remarkable comprehensiveness and precision of his generalizations. The University method of geographical education which he employs is first the examination and classification of a large number of facts in the geographical laboratory, using typical maps and models as a substitute for the actual land-forms. Finding that the inductive method does not lead to profitable results, he proceeds to elaborate a system of deductive geography. The primary fact is that the wasting forces of erosion tend to wear down to an ultimate base-level any form of elevated land surface. An elevated surface is termed *constructional*, the wasting forces *destructional*, and the series of changes including the construction of a land surface from a plain and the destruction of the surface to base-level again is termed a *geographical cycle*. At the commencement of a cycle a system of *constructional drainage* is established, depending on the forms of the land. This stage passes at once into the system of *consequent drainage* when the streams, following the *trough-lines*, proceed to *degrade* and *aggrade* their channels. Differences in the hardness of strata traversed give rise to *subsequent* forms of cascade or valley in the course of the consequent stream. The *divides* and *stream-profiles* also undergo subsequent change; the river-beds grow flatter, the streams slower, and their erosive work more feeble. Thus the stages of infancy, youth, adolescence, maturity, old age, and second childhood may be distinguished in a geographical cycle. Many complications are introduced in the complete study of a cycle, and a large number of additional terms must be employed to define them. Professor Davis insists on the absolute necessity of clear thinking and continuous mental effort on the part of the student under this system, and on the importance of a large and very carefully selected series of characteristic maps to illustrate each stage of the geographical cycle. "When thus developed," he says, "physical geography may worthily claim the dignity of a University study. Its subject-matter is of importance in itself, as well as in its relations to geology, zoology, and botany, or to history and economics. Its methods are of value in training various mental faculties, observation, description, generalization, imagination, comparison, discrimination; these are all cultivated to a high degree in the student who successfully utilizes the opportunities of the course."

GENERAL.

The "Challenger" Publications.—We understand that the last two volumes of the *Challenger* Reports are now in the binder's hands, and will be issued immediately, thus bringing to a conclusion the twenty years of active scientific work which were required to discuss the mass of new observations and material collected on the famous cruise. The completed set of volumes, which numbers fifty, forms an encyclopædia of Oceanography, every chapter of which is written by a prominent specialist, and the whole work planned and edited, first by the late Sir Wyville Thomson, and latterly by Dr. John Murray, who writes the general summary of results in the concluding volume. The work has been carried through at the expense of Government, and we believe that about one hundred complete sets remain in the warehouses of the Stationery Office. The proper disposal of these is a matter of the greatest importance, and it is most desirable that this, the greatest work on Physical Geography ever produced, should be rendered accessible to all geographers and scientific workers who are capable of making use of it. For this purpose it would be necessary to draw up a list of the principal universities and scientific libraries in all parts of the world, and select from them those which, in the opinion of an impartial committee, should receive presentation sets, or, in case of the Government not seeing its way to gratuitous distribution, which should be afforded an opportunity for purchasing, at cost price, before the work is offered to the general public. This is a case in which the purchase of even a single set by a private individual is a loss to science, for no one man could possibly make use of the whole work. The approaching Geographical Congress would furnish a good opportunity for the appointment of an International Committee to advise on the most useful disposal of copies; and our Government could, by a single well-timed act of generosity, repay all foreign nations for their unstinted gifts of national publications to the institutions and libraries of this country.

The Geographical Association.—This Association, which was started in 1893 with the view of improving geographical teaching in public schools, held its first annual meeting on December 21, at the Royal Colonial Institute. Mr. G. R. Parkin occupied the chair, and the reports of the secretary, Mr. B. Bentham Dickinson, and of the treasurer were read. The Association has, mainly through the enthusiastic services of Mr. Dickinson, arranged a nearly complete system of educational maps and pictures in the form of lantern slides. These are in sets dealing with the different continents and the more important countries, and are lent out to the schools which have joined the Association. At present seven schools make use of these slides, viz.: Rugby (where Mr. Dickinson is an assistant master), Fettes, Haileybury, Marlborough, Shrewsbury, University College School, and Nottingham High School. Mr. H. J. Mackinder then gave a most suggestive address on geography as a training for the mind, which we hope to print in the *Journal* at an early date, and the meeting concluded with a practical demonstration by Mr. Dickinson of his method of teaching by aid of the Association's lantern slides. We understand that the Geographical Association is endeavouring to raise the position of geography in education by bringing before various examining bodies the importance of giving more value to geographical answers, and the necessity in many cases of setting more reasonable papers, the preparation for which may be made an occasion for a rational system of teaching.

MEETINGS OF THE ROYAL GEOGRAPHICAL SOCIETY, SESSION 1894–95.

Fourth Ordinary Meeting, *January* 7, 1895.—CLEMENTS R. MARKHAM, ESQ., C.B., F.R.S., President, in the Chair.

ELECTIONS.—*Walter H. Brown, C.E.; H. Fredk. John Burgess; George Leiper Farnum; James Edward Farnum; H. W. A. Harrison (Barrister-at-law); William Thomas Rabbits, F.L.S.; Henrik Vroom; Arthur Ll. Griffith Williams; William John Woodhouse, B.A.*

The Paper read was :—

"A Visit to the Luchu Islands." By Basil Hall Chamberlain.

The PRESIDENT said: In opening the first meeting of the year, I wish to express my gratification at the very large number of Fellows who were able to respond to my invitation to the reception last month, when they had an opportunity of seeing for themselves their own premises and their own possessions, I hope in an agreeable way. I must also take this opportunity of referring to the letter that has been sent round to the Fellows, on the subject of the International Geographical Congress. When we were directly invited to have a congress in London, it was quite unavoidable that we should do so, and we must now do our best to make it a success. A great deal will be expected from us, but I feel sure that my associates will work to make it as great a success as it ever has been in any other country. For we must not only do as well, we are bound to do better, than our friends abroad. We must raise at least, I believe, £3500. We have received by subscription £187, by donations £268 = £455; our Council has granted £600 = £1055, which must be increased to £3500, and I have no doubt that can easily be done. There is not only the credit of this Society at stake, but the credit of London and of the country requires that the congress should be a success. We are inviting a great number of distinguished foreigners to come to us as our guests, and we must see to their reception, not only as geographers, but as patriotic Englishmen zealous for the credit of our country.

Afternoon Technical Meetings. Tuesday, November 19, 1894.—Clements R. Markham, Esq., c.b., f.r.s., President, in the Chair.

The Paper read and discussed was:—

"A Pre-Columbian Discovery of America." By H. Yule Oldham, Esq., m.a.

January 22, 1895.

"Terrestrial Magnetism." By Prof. A. W. Rücker, f.r.s.

GEOGRAPHICAL LITERATURE OF THE MONTH.

Additions to the Library.

By HUGH ROBERT MILL, D.Sc., *Librarian*, R.G.S.

The following abbreviations of nouns and the adjectives derived from them are employed to indicate the source of articles from other publications. Geographical names are in each case written in full:—

A. = Academy, Academie, Akademie.
Ann. = Annals, Annales, Annalen.
B. = Bulletin, Bollettino, Boletim.
Com. = Commerce, Commercial.
C. R. = Comptes Rendus.
Erdk. = Erdkunde.
G. = Geography, Geographie, Geografia.
Ges. = Gesellschaft.
I. = Institute, Institution.
J. = Journal.
M. = Mitteilungen.
Mag. = Magazine.
P. = Proceedings.
R. = Royal.
Rev. = Review, Revue, Revista.
S. = Society, Société, Selskab.
Sitzb. = Sitzungsbericht.
T. = Transactions.
V. = Verein.
Verh. = Verhandlungen.
W. = Wissenschaft, and compounds.
Z. = Zeitschrift.

On account of the ambiguity of the words *octavo*, *quarto*, etc., the size of books in the list below is denoted by the length and breadth of the cover in inches to the nearest half-inch. The size of the *Journal* is 10 × 6½.

EUROPE.

Alps—Eastern. *Deutsch. u. Oesterr. Alpenvereins* 25 (1894): 1–94. **Richter.**

Die wissenschaftliche Erforschung der Ostalpen seit der Gründung des Oesterreichischen und des Deutschen Alpenvereins. Von Ed. Richter.

Alps—Glaciers. *Jahrb. Schweizer Alpenclub* 29 (1893–94): 213–254. **Forel.**

Prof. Dr. F.-A. Forel: Les variations périodiques des glaciers des Alpes. Quatorzième Rapport.

Austria-Hungary—Dalmatia. *M.G. Ges. Wien* 37 (1894): 545–557. **Gelcich.**

Die wirthschaftliche Lage Dalmatiens. Bemerkungen von E. Gelcich.

The discussion of the economic condition of Dalmatia concludes with a statement as to the great importance to that region of a complete system of railway connection with the rest of the monarchy.

Central Pyrenees. *Annales G.* 4 (1894): 30–46. **Paringaux.**

Les futures voies ferrées des Pyrénées Centrales. Par M. A Paringaux.

A discussion of the various schemes for penetrating the Pyrenees by railways through valleys and tunnels.

England—Magnetic Dip. **Felgentraeger.**

Die Isoklinen Karte von Whiston und die säkulare Aenderung der magnetischen Inklination im östlichen England. Von Wilhelm Felgentraeger. Aus den Nachrichten der K. Gesellschaft der Wissenschaften zu Göttingen. Mathematisch-physikalische Klasse, 1894. Size 9½ × 6½, pp. 12. *Presented by Prof. Dr. Hermann Wagner.*

France.—Lake Bourget. *C.R.* 119 (1894): 931–933. **Delebecque.**

M. A. Delebecque. Sur l'âge du lac du Bourget et les alluvions anciennes de Chambéry et de la vallée de l'Isère.

Germany—Harz. *M. V. Erdk. Halle a. S.* (1894): 35–44. **Damköhler.**
Die Bevölkerung des Harzgebietes. *With Map.* Von Oberlehrer Eduard Damköhler.

Germany—Harz. *M. V. Erdk. Halle a. S.* (1894): 1–35. **Steinhoff.**
Von den Teufelsmauern bei Blankenburg und bei Thale am Harz. Von Rudolf Steinhoff.

Germany—Spessart. *Notizblatt. V. Erdk. Darmstadt* (1893): 9–18. **Klemm.**
G. Klemm: Gletscherspuren im Spessart und östlichen Odenwald. *With Plates.*

On glacial remains in the neighbourhood of Aschaffenburg.

Iberian Peninsula. *Petermann's M.* 40 (1894): 249–256, 277–285. **Fischer.**
Versuch einer wissenschaftlichen Orographie der Iberischen Halbinsel. Von Prof. Dr. Th. Fischer. *With Map.*

Iceland. **Walker.**
History of the Rev. Oddo V. Gislason, Minister of Staðr i Grindavik (Reykjanes S. W. of Iceland), and missionary in the summer season to his countrymen on the W., N., and E. coasts when engaged in fishing, as well as to fishermen of other nationalities, as a preacher of equal facility in Danish, Icelandic, and English, and his correspondence with Rev. F. A. Walker, D.D., in the years 1890–1894. Also letters from Right Rev. Hallgrimr Sveinuson, Lord Bishop of Iceland, A. Thorsteinson, . . . and Th. Thoroddsen, Geologist of Iceland, etc. MS. *Presented by Rev. F. A. Walker, D.D.*

This manuscript volume contains a great deal of general information regarding Iceland and Icelandic history.

Montenegro. *M. G. Ges. Wien* 37 (1894): 607–623. **Hassert.**
Zur kartographischen Kenntniss von Montenegro. Von Dr. Kurt Hassert.

Norway—Historical. *Norske G.S. Aarbog* 5 (1893–1894): 91–106. **Storm.**
Om opdagelsen af "Nordkap" og veien til "det hvide hav" af prof. dr. Gustav Storm. *With Map.*

Russia—Caucasus. ———
Collection of Materials (Sbornik Materialov) for the description of Regions and Inhabitants of Caucasus. Published by the Administration of the Caucasian Educational District. Vol. xviii. Tiflis, 1894. [In Russian.]

The excellent idea of the Caucasian Education Department, to invite teachers to collect geographical and ethnographical materials in their own localities, most of which are but seldom visited by scientific explorers, and to publish them as a separate periodical, continues to bear excellent fruit. The eighteenth volume of this publication, which was started only a few years ago, is as interesting as the preceding ones. It contains a very valuable collection of Mingrelian songs—some of which have a historical value—with their music, a glossary, and the Russian translation, as well as a good deal of varied linguistic materials for other Caucasian languages. [P.K.]

Russia—Pinsk Marshes. *Globus* 66 (1894): 293–300. **Immanuel.**
Die Trockenlegung des Poljesje. Von F. Immanuel, Wittenberg. *With Map.*

The map shows the present extent of the famous Pinsk marshes, and the areas which have been drained and reclaimed up to 1893.

Russia—South Ural. *Verh. Ges. Erdk. Berlin* 21 (1894): 522–534. **Futterer.**
Herr Dr. K. Futterer: Ein Ausflug nach dem Süd-Ural. *With Map.*

Illustrated by a tectonic and orographic map of the southern end of the Ural system.

Southern Europe. **Fischer.**
Uebersicht über die wissenschaftliche Litteratur zur Länderkunde Südeuropas. Von Prof. Dr. Theobald Fischer in Marburg. [From Geographisches Jahrbuch. XVII. Band, 1894 . . . herausgegeben von Hermann Wagner.] Size 8½ × 5½, pp. [65]. *Presented by the Author.*

Switzerland. ———

Annuaire Statistique de la Suisse. Publié par le Bureau de Statistique du Département Fédéral de l'Intérieur. Quatrième Année, 1894. Bern, 1894. Size 9½ × 6½, pp. xviii. and 444. *Map.*

Switzerland. **Zemmrich.**

Verbreitung und Bewegung der Deutschen in der französischen Schweiz. Von Dr. J. Zemmrich. [Forschungen zur deutschen Lands- und Volkskunde . . . herausgegeben von Dr. A. Kirchhoff. Achter Band, Heft 5.] Stuttgart: J. Engelhorn, 1894. Size 9½ × 6½, pp. 45. *Map.*

This interesting memoir discusses the distribution of the German-speaking people in Western Switzerland, where the prevailing language is French.

ASIA.

Annam. *Tour du Monde* **68** (1894): 401–416. **Lemire.**

Aux Monuments anciens des Kiams (Excursion Archéologique en Annam). Par M. Charles Lemire. *With Illustrations.*

Arabia. *Globus* **67** (1895): 1–6. **Baumann.**

Besuch von Lahadj in Südarabien. Von Dr. Oskar Baumann. *With Illustrations.*

A flying visit to an oasis in the Arabian desert admirably described.

Armenia—Ararat. *Globus* 66 (1894): 309–315. **Seidlitz.**

Pastuchows Besteigung des Ararats. Von N. v. Seidlitz. *With Illustrations.*

Translation of a paper read to the Caucasian section of the Russian Geographical Society in May, 1894. The ascent was made in August, 1893, and the minimum thermometer left on the summit in August, 1888, by Dr. Markoff was found to register −3° F., which, however, is not supposed to be the true minimum temperature.

Asia Minor—Archæology. *Sitzb. A. W. Berlin* (1894): 899–920. **Fabricius.**

Archæologische Untersuchungen im westlichen Kleinasien. Von Prof. E. Fabricius.

The archæological results of the expedition on which Professor Fabricius accompanied Professor Kiepert in 1888. A number of Greek inscriptions are quoted in the text.

Borneo. *Globus* **66** (1894): 336–338. **Zondervan.**

Hallier's Botanische Reisen in West-Borneo. Von H. Zondervan. *With Map.*

Abstract of the Dutch report of Dr. H. Hallier on his botanical journey in 1893–94 in Sumatra.

China. *J.R.I. British Architects* 2 (3rd ser.) (1894): 37–64. **Gratton.**

Notes upon the Architecture of China. By F. M. Gratton. *With Illustrations.*

The illustrations show some fine examples of different classes of Chinese architecture.

India—Bhutan. *Scottish G. Mag.* 10 (1894): 635–640. **Godwin-Austen.**

Bhutan and the Himalayas East of Darjeeling. By Colonel Godwin-Austen.

An abstract of a paper read before Section E of the British Association at Oxford in 1894.

India—Punjab—Lahore. **Walker.**

Gazetteer of the Lahore District. By G. C. Walker, 1893–94. Revised Edition. Compiled and published under the authority of the Punjab Government, Lahore, 1894. Size 10 × 7, pp. xiii., 336, and lxvi. *Presented by the Secretary of State for India.*

India—Sikkim. *Missions Catholiques* **26** (1894): 513, 524, 538, 549, 559. **Gryse.**

A travers le Sikkim. Lettre du R. P. de Gryse. *With Illustrations.*

Indo-China—Tonkin. ———

Publications de l'Union Coloniale Française. No. 8, Octobre 1894. Le Port du Tonkin dans la rade de Tien-Yen. Paris: A. Challamel, 1894. Size 8 × 5½, pp. 18. *Plans. Presented by the Union Coloniale Française.*

Korea. *Globus* **66** (1894): 357–360. **Immanuel.**

Die Broughton-Bai (Ostküste von Korea). Von J. Immanuel. *With Map.*

Malay Archipelago. ——

Glimpses of the Eastern Archipelago. Ethnographical, geographical, historical. Translated from the Dutch by Geo. G. Batten, Singapore. Printed at the Singapore and Straits Printing Office, 1894. Size 9 × 6¼, pp. 138. *Presented by the Translator.*

A series of interesting extracts from Dutch papers well translated, and affording a number of vivid glimpses into the life, habits, and history of the natives of the Dutch East Indies.

Malay Archipelago—Moluccas. *V. Ges. Erdk. Berlin* 21 (1894): 506–521. **Martin.**

Herr Prof. K. Martin: Ueber seine Reise in den Molukken, durch Buru, Seran und benachbarte kleinere Inseln. *With Map.*

Dr. Martin visited the Moluccas in 1891 on a geological excursion, and this paper contains his geographical observations on the land and people.

Perak—Tin Mines. **Wray.**

Perak Museum Notes, No. III. The Tin Mines and the Mining Industries of Perak, and other papers. By L. Wray, jun. Also a paper on the Padi Industry of Krian, by H. W. C. Leech, LL.D., and an Itinerary of a Trip to Gunong Bintang, by G. A. Lefroy, Chief Surveyor, Perak. Taiping, 1894. Size 9½ × 6¼, pp. 78. *Map and Plates.*

The main paper in this number of the Perak Museum Notes is the first instalment of a full and authoritative account of the tin mines of Perak, historical, geological, and economic.

Siberia—Fish-skin Tartars. *J. China Br. R. Asiatic S.* 26 (1894): 1–43. **Fraser.**

The Fish-skin Tartars. By E. H. Fraser.

A description of the Orochi of the Amur from Russian sources.

AFRICA.

Algeria—Sahara. *B.S.G. Paris* 15 (1894): 430–466. **Colonieu.**

Voyage au Gourâra et a l'Aougueroût (1860). Par le Commandant Colonieu.

This is the concluding part of a paper the earlier instalments of which were published in the *Bulletin* of the Paris Society in 1892 and 1893.

Algeria—Sahara. *Norske G. S. Aarb.* 5 (1893–1894): 1–23. **Nielsen.**

Atlas og Sahara af prof. dr. Yngvar Nielsen. *With Illustrations.*

British Central Africa. **Johnston.**

Africa. No. 6 (1894). Report by Commissioner Johnston of the first three years' Administration of the Eastern Portion of British Central Africa, dated March 31, 1894. London: Eyre and Spottiswoode, 1894. Size 13½ × 8½, pp. 43. *Maps. Price* 1*s.* 10½*d.*

The geographical results referred to in this report are also contained in Mr. Johnston's forthcoming paper in the *Journal.*

British South Africa. **Knight.**

Rhodesia of To-day. A description of the present condition and the prospects of Matabeleland and Mashonaland. By E. F. Knight. London: Longmans & Co., 1895. Size 8 × 5, pp. vii. and 151. *Map. Price* 2*s.* 6*d.* *Presented by the Publishers.*

Mr. Knight, after travelling through Matabililand and Mashonaland for seven months in 1894, gives a brief but interesting account of the present state of the country, which will command the confidence of the reader. He pronounces the climate remarkably favourable for white men, and praises the administration of the territories, especially noting the good effect of just and kindly treatment on the natives.

British West Africa. **Lucas.**

A Historical Geography of the British Colonies. By C. P. Lucas. Vol. iii.—West Africa. Oxford: the Clarendon Press, 1894. Size 7½ × 5¼, pp. 283. *Maps. Price* 7*s.* 6*d.*

East Africa. *Deutsches Kolonialblatt* 5 (1894): 549–553, 575–584. **Lent.**

Ueber Verkehrsmittel in Ostafrika. Von Dr. Lent.

A discussion of the whole question of transport by means of animals in different parts of Africa, taking account of carriage traffic and beasts of burden, with special reference to the camel, ox, horse, ass. and mule.

Egypt. **Baedeker.**

Egypt. Handbook for Travellers. Edited by Karl Baedeker. Part I. Lower Egypt and the Peninsula of Sinai. Third Edition. Leipsic, Karl Baedeker; London, Dulau & Co., 1895. Size 6½ × 4½, pp. ccxvi. and 293. *Maps, Plans, etc. Price 12 marks. Presented by Messrs. Dulau & Co.*

French Congo—Kwilu. *B.S.G. Paris* (1894): 403–429. **Jacob.**

La vallée du Niari—Kouilou, reconnaissances préliminaires pour l'étude des voies de communication. Par Léon Jacob. *With Map.*

The map of the Kwilu river was the result of surveys by M. Jacob in 1886, 1887, and 1888.

French West Africa—Bondu. **Rançon.**

Le Bondou. Étude de Géographie et l'histoire Soudaniennes de 1681 à nos jours. Par le Dr. A. Rançon. Bordeaux: Imp. G. Gounouilhou, 1894. Size 10 × 6½, pp. 188. *Map. Presented by the Author.*

This memoir has been referred to during its serial publication in the *Bulletin* of the Bordeaux Commercial Geographical Society.

German East Africa. **Lent.**

Deutsches Kolonialblatt. 5 (1894): 599–607, 630–633, 653–659. Vorschläge zur Verbesserung der Verbindung des Kilimandjarogebiets mit der Küste. Von Dr. Karl Lent. *With Map.*

A full discussion of the importance of improving the means of communication between the temperate slopes of Kilimanjaro and the coast.

German East Africa. *M. Deutsch. Schutzgeb.* 7 (1894): 271–282. **Lieder.**

Beobachtungen auf der Ubena-Nyasa-Expedition. 11 November 1890 bis 30 März, 1894. Von G. Lieder.

Zur Kenntniss der Karawanenwege im südlichen Theile des ostafrikanischen Shutzgebietes. Von G. Lieder. *With Maps.*

German East Africa. *M. Deutsch. Schutzgeb.* 7 (1894): 282-291. **Stuhlmann.**

Bericht über eine Reise im Hinterlande von Bagamoyo, in Ukami und Uluguru. Von Dr. J. Stuhlmann.

St. Helena. *Asiatic Quarterly R.* 9 (1895): 99–116. **Sterndale.**

R. A. Sterndale. St. Helena—the Gibraltar of the S. Atlantic.

Mr. Sterndale gives a careful account of the resources of St. Helena, deploring the neglect to which the island has lately been subject, and pointing out that it is still a strategic position of much importance.

Somaliland—Harrar. **Harris.**

A recent visit to Harrar. By Walter B. Harris. From *Blackwood's Magazine*, September, 1894.

South Africa. **Ricarde-Seaver.**

Diamonds and Gold. Anglo-Saxon supremacy in South Africa, 1814–1894. By Major F. J. Ricarde-Seaver. From the *New Science Review*, July, 1894.

NORTH AMERICA.

Alaska Frontier. *C.R.* 119 (1894): 981–983. **Laussedat.**

M. Laussedat: Reconnaissance faite à l'aide de la Photographie, pour la délimitation de la frontière entre l'Alaska et la Colombie britannique.

Canada. *Scottish G. Mag.* 11 (1895): 1–16. **Tupper.**

Anniversary Address: The Economic Development of Canada. By Sir Charles Tupper, Bart. *With Maps.*

This paper is illustrated by eight maps and two statistical diagrams illustrative of the progress and present position of the Dominion.

Canada. *P. and T.R.S. Canada* 11 (1893): Section 3, 55–60. **Johnson.**

On the need of a "Coast Survey" for the Dominion of Canada. By A. Johnson.

A plea for the establishment of a special marine survey department for the Canadian coasts.

Canada—Canals. *P. and T.R.S. Canada* 11 (1893): Section 3, 25–50. **Keefer.**

The Canals of Canada. By T. C. Keefer. *With Maps and Plans.*

An excellent account of the Canadian canals, with maps and sections showing the present state of inland navigation in the Dominion, with a section on projected canals and statistical tables of the canal-borne traffic from 1870 to 1891.

Canada—Longitudes. *P. and T.R.S. Canada* 11 (1893): Section 3, 51–53. **McLeod.**

Memorandum on the Work of the Montreal Longitude Determination. By C. H. McLeod.

Telegraphic determinations of longitude were made in 1893, from which the following provisional time-intervals from Greenwich have been calculated: Montreal, $4^h\ 54^m\ 18{\cdot}7^s$; Canso, $4^h\ 4^m\ 41{\cdot}3^s$; and Waterville (Ireland), $0^h\ 40^m\ 9{\cdot}3^s$.

Canada—Niagara Falls. *American J. Science* (3) 48 (1894): 455–472. **Spencer.**

The Duration of Niagara Falls. By J. W. Spencer.

A note on this subject will appear in the Monthly Record.

Lake Superior—Sailing Directions. ———

No. 108—Part I. U.S. Hydrographic Office. Sailing directions for Lake Superior, St. Mary's River, and Straits of Mackinac. Washington: Government Printing Office, 1894. Size 9½ × 6, pp. vi. and 115. *Charts and Plates. Presented by the U.S. Hydrographic Office.*

The first issue of a new manual of sailing directions.

Mexico. ———

Anuario del Observatorio Astronomico Nacional de Tacubaya para el Año de 1895 formado bajo la dirección del Ingeniero Ángel Anguiano. Año XV. Mexico, 1894. Size 7½ × 5½, pp. 414. *Presented by the Observatory.*

Rocky Mountains. *P. and T.R.S. Canada* 11 (1893): Section 3, 13–15. **Deville.**

Lever topographique des Montagnes Rocheuses, exécuté par la photographie. Par E. Deville. *With Map.*

The map is a beautifully executed piece of hill-work, with contour-lines at intervals of 100 feet combined with shading; the scale is 1: 40,000.

United States—California. **Ransome.**

The Geology of Angel Island. By F. Leslie Ransome, with a Note on the Radiolarian Chert from Angel Island and from Buriburi Ridge, San Mateo County, California, by George Jennings Hinde, PH.D. University of California, *Bulletin* of the Department of Geology, vol. i., No. 7, pp. 193–240. Berkeley, 1894. Size 10½ × 7.

United States—Census. *J.R. Statistical S.* 57 (1894): 643–677. **Porter.**

The Eleventh United States Census. By Hon. Robert P. Porter (Superintendent of the Eleventh Census).

United States—Mississippi. **Levasseur.**

La Question des Sources du Mississipi. Par M. E. Levasseur. (Extrait du Bulletin de géographie historique et descriptive [Comité des travaux historiques et scientifiques siégeant au Ministère de l'instruction publique]. 1894.) Size 10 × 6½, pp. 15. *Maps. Presented by the Author.*

This will receive separate notice.

MATHEMATICAL AND PHYSICAL GEOGRAPHY.

Ancient Land-masses. *Annales G.* 4 (1894): 92–100. **Priem.**

L'extension ancienne des Terres australes. Par M. F. Priem.

A statement of the results of recent observations and speculation.

Botanical Maps. *C.R.* 119 (1894): 1236–1239. **Flahault.**

Sur une Carte botanique détaillée de la France. Note de M. Ch. Flahault.

This is noticed elsewhere.

Land-Forms. **Lapparent.**

L'Age des formes topographiques. Par A. de Lapparent. Extrait de la *Revue des questions Scientifiques*, Octobre 1894. Brussels: Imp. Polleunis & Centerick. Size 10 × 6½, pp. 53. *Presented by the Author.*

An effort to emphasize the importance of the mutual relations of geology and geography, with reference to the treatment of land-forms as of various ages in the cycle of development of a land surface by earth-movements and erosion. Professor Lapparent notes with approval the attempts of Professors Penck and Davis to introduce systematic geographical nomenclature.

Magnetism. **Kostinsky.**

No. 109. U.S. Hydrographic Office. Contributions to Terrestrial Magnetism, the Variation of the Compass. From Observations made in the United States Naval Service during the period from 1881–1894. Washington: Government Printing Office, 1894. Size 9½ × 6, pp. 50. *Presented by the U.S. Hydrographic Office.*

Map of the World. **Barbier.**

Le Projet de Carte de la Terre à l'échelle du 1/1,000,000" devant la Commission technique de la Société de Géographie de l'Est. Rapport présenté par M. J. V. Barbier. Nancy: Berger-Levrault & Co., 1894. Size 9 × 5½, pp. 48. *Presented by the Author.*

This report will be referred to elsewhere.

Meteorology—Clouds. **Ley.**

Cloudland, a Study on the Structure and Characters of Clouds. By Rev. W. Clement Ley. London: E. Stanford, 1894. Size 9½ × 6, pp. xiv. and 208. *Charts, Plates, and Diagrams. Price 7s. 6d. Presented by the Publisher.*

A series of beautiful reproductions of Mr. A. W. Clayden's typical cloud photographs and of the author's water-colour sketches, add much to the value of this important book.

Ocean Currents. *P. and T. Queensland Br. R.G.S. Australasia* 9 (1893–94): 52-58. **Boyd.**

A remarkable Bottle-voyage. By Major A. J. Boyd.

The bottle in question was launched on December 4, 1890, in 11° 26′ S. and 147° 30′ E., and was recovered in October, 1892, in 6° 10′ N. and 171° 30′ E., a minimum drift of nearly 1900 miles having taken place. The time was far too long to allow of any inference as to direction or rate of currents being drawn.

Oceanography. *Natural Science* 6 (1895): 30-37. **Dickson.**

The Distribution of Food-Fishes in relation to their Physical Surroundings. By H. N. Dickson. *With Chart.*

Mr. Dickson discusses the bearings on marine life of his own and other observations of the physics of the oceans.

Oceanography. *Scottish G. Mag.* 10 (1894): 449–462, 525–539, 617–635. **Pettersson.**

A Review of Swedish Hydrographic Research in the Baltic and the North Seas. By Otto Pettersson. Parts IV.–VIII. *With Charts and Sections.*

The concluding instalment of this fine memoir is now published. A separate copy has been presented by the Author.

Oceanography—Wind and Waves. *Sitzb. A. W. Berlin* (1894): 509–525. **Wien.**

Ueber den Einfluss des Windes auf die Gestalt der Meereswellen. Von Dr. Willy Wien.

A mathematical inquiry into the characteristic forms of waves corresponding to different degrees of wind-force.

Physical Geography. **Mill.**

The Realm of Nature: an Outline of Physiography. By Hugh Robert Mill. [Fifth thousand.] London: John Murray, 1894. Size 7½ × 5, pp. xii. and 370. *Maps and Illustrations. Price 5s. Presented by the Author.*

The text has been thoroughly revised since the first issue was reviewed in the *Proceedings*, vol. xix. p. 506.

Physical Geography. **Penck.**

Morphologie der Erdoberfläche von Dr. Albrecht Penck. Bibliothek Geographischer Handbücher, herausgegeben von Prof. Dr. Friedrich Ratzel. Stuttgart: J. Engelhorn, 1894. Size 9 × 6. 2 vols. Vol. i., pp. xiv. and 472; vol. ii., pp. x. and 696. *With Diagrams. Price 32 marks. Presented by the Publishers.*

This work is likely to become the standard book of reference for physical geography in the strict sense of the term, and a full notice will shortly be published in the *Journal.*

Physiography. ———

Elementary Physiography; or, Earth Lore. Adapted to the latest requirements of the Department of Science and Art. Revised Edition. London: G. Gill and Sons, 1894. Size 7½ × 5¼, pp. 318. *Map and Illustrations. Price 2s. 6d. Presented by the Publishers.*

A compilation of extracts from works which are not always the most recent.

Plant-Distribution. *T. South African Philos. S.* 5 (1886–1888): 275–294. **Guthrie.**

On the subjective causes of Evolution as illustrated by the Geographical Distribution of plants. By Professor F. Guthrie.

Plant-Distribution. **Schweinfurth and Ascherson.**

Primitiæ Floræ Marmaricæ, von G. Schweinfurth und P. Ascherson. Mit Beiträgen von P. Saubert. Geneva, Romet, 1893. Size 9½ × 6½. *Plate.*

Plant-Geography. *J. Linnean S.* **30** (1894): 219–263. **Henslow.**

The Origin of Plant-Structures by Self-Adaptation to the Environment, exemplified by Desert or Herophilous Plants. By the Rev. George Henslow.

The author shows how a plant accommodates itself to the peculiarities of its inorganic environment by undergoing structural modifications advantageous to life in its special surroundings. Such changes may be produced in a single generation. Many curious examples are given of plants which rapidly accommodate themselves to new conditions.

Rivers and Estuaries. **Vernon-Harcourt and Partiot.**

Min. P. I. Civil Engineers **118** (1894): 1–189.

The Training of Rivers, illustrated by the Results of various Training-Works. By Leveson Francis Vernon-Harcourt.

Estuaries. By Henri Léon Partiot.

These are important practical papers, rendered more valuable by a voluminous series of comments and criticisms by many authorities; but they have considerable geographical interest as well. M. Partiot adopts a definition of *estuary* which gives the word a meaning somewhat different from that usually employed. He says, "Estuaries are inlets on or near the sea-coast, containing banks which the tides successively cover and lay bare;" and he divides them into two classes—estuaries without rivers, and those into which rivers flow, subdividing each class into estuaries with wide and those with restricted outlets.

River-Entrances. *Rev. G.* **34** (1894): 168–178. **Girard.**

Étude sur les embouchures des fleuves. Par J. Girard.

River Courses. **Günther**

Topographische Studien zur Gestaltung der Flussläufe. Von Prof. Dr. Siegm. Günther. Separatabdruck aus Nachrichten über Geophysik, herausgegeben von J. Berringer und Joh. F. Fehlinger (Band I., 1894). Vienna. Size 9 × 6, pp. 10. *Presented by the Author.*

River Temperature. **Forster.**

Die Temperatur fliessender Gewässer Mitteleuropas. Von Dr. Adolf E. Forster in Wien. Mit einer Tafel und XXV. Tabellen. Vienna, E. Hölzel. 1894. Size 11 × 7½, pp. 96.

This forms Band 5, Heft. 4, of Penck's *Geographische Abhandlungen*, and the subject with which it deals—the temperature of rivers in Europe—will be referred to elsewhere in the *Journal.*

Sea Margins. **Girard.**

La Géographie Littorale, par Jules Girard. Paris, Société d'Editions Scientifiques, 1895 [1894]. Size 10 × 6½, pp. 232. *Price 6 fr. Presented by the Author.*

M. Girard has here combined into a volume the series of articles which we have noticed separately on their original publication in the *Revue de Géographie.* He treats, but not exhaustively, of the movements of water in the sea, coast erosion, the movement of sand in dunes and banks, the origin of beaches, deltas, estuaries, and the evidence of Earth-movements supplied by littoral phenomena. There are numerous illustrations, the sketch-maps being clear and useful, but the views do not add any value to the book.

Tropical Cultivation. **Des Vœux.**

Delusions about Tropical Cultivation. By Sir G. William Des Vœux. From the *Nineteenth Century*, July, 1894.

GENERAL.

Almanac. **Olsen.**

1895. The Fisherman's Nautical Almanack and Tide Tables. A Directory of all British Fishing Vessels, Steamers, etc. By O. T. Olsen, Grimsby; and London, J. D. Potter [1894]. Size 7 × 5, pp. 420. *Price* 1*s*. *Presented by the Compiler.*

Anthropological Congress. **Wake.**

Memoirs of the International Congress of Anthropology. Edited by C. Staniland Wake, on behalf of the Publication Committee. Chicago, 1894. Size 10 × 6½, pp. 376. *Plates. Presented by Francis Parry, Esq.*

Besides the presidential address by Dr. Brinton, these memoirs consist of thirty-four papers, grouped under Physical Anthropology, Archæology, Ethnology, Folklore, Religions, and Linguistics, and, with the exception of two in German, they are all printed in English.

Antiquarian Research—The Runes. **Stephens.**

The Runes, whence came they? By Prof. Dr. George Stephens. London and Copenhagen: Williams and Norgate, H. H. Lynge, 1894. Size 11½ × 8½, pp. 96. *Illustrations. Presented by the Publishers.*

A catalogue of Runic inscriptions and literature recently discovered, the numerical consideration of which shows that in "Scando-Anglia" 10,423 Runic remains have been discovered, while only 19 have been found elsewhere.

Arabic Languages. **Seidel.**

Praktisches Lehrbuch der Arabischen Umgangssprache syrischen Dialekts. Erläutert durch zahlreiche mit Uebersetzung und Wörterverzeichnis versehene Uebungsstücke. Von A. Seidel. Vienna: A. Hartleben, (not dated) [1894]. Size 7 × 4½, pp. viii. and 190. *Presented by the Publisher.*

Bibliography. **Luzac.**

Bibliographical List of Books on Africa and the East, published in England, between the Ninth Oriental Congress in London in 1892, and the Tenth Oriental Congress at Geneva in 1894. Systematically arranged with Authors' Index. By C. G. Luzac. London, 1894. Luzac & Co. Size 8 × 4, pp. 90. *Price* 1*s*. *Presented by the Publishers.*

A useful list of recent English books of Oriental and African travel and research.

Biography—Johnston. **Johnston.**

Why I became an Explorer. A chat with Mr. H. H. Johnston, C.B. From *Cassell's Saturday Journal*, August 29, 1894. Size 12 × 9½ [1 page].

Biography—Mercator. *Deutsche Rundschau G.* 17 (1894): 132–136. **Wolkenhauer.**

Gerhard Mercator. Ein Gedenkblatt zu seinem 300 jährigen Todestage am 2, December, 1894. Von Dr. W. Wolkenhauer in Bremen. *With Portrait.*

Biography—Oppert. *Deutsche Rundschau G.* 17 (1895): 181–183. **Miessler.**

Ernst Oppert. By Adolf Miessler. *With Portrait.*

Biography—Oswell. **Hughes.**

William Cotton Oswell. By His Honour Judge Hughes. From *Macmillan's Magazine*, August, 1894. Size 9 × 6, pp. 6.

Biography—Prince Henry the Navigator. **Alves.**

Alfredo Alves: Dom Henrique o Infante, Memoria Historica Porto: Typ. do "Commercio do Porto," 1894. Size 11 × 8½, pp. 126. *Presented by the Author.*

Biography—Topley. **Woodward.**

Memoir of William Topley, F.R.S. By H. B. Woodward. (Reprinted from the *Geological Magazine*, Decade iv., vol. i., December, 1894.) Hertford: S. Austin & Sons, 1894. Size 8½ × 5½, pp. 16. *Portrait.*

Besides a biographical notice, this memoir includes a list of Mr. Topley's writings, many of which were geographical.

Biography—Wild. *Deutsche Rundschau G.* 17 (1895): 89–90. **Egli.**

Der Topograph Johannes Wild. Von J. J. Egli. *With Portrait.*

British Empire. **Colomb.**

Wanted, an Imperial Conference. By Sir John Colomb, K.C.M.G. From the *Nineteenth Century*, December, 1894. Size 10 × 6½, pp. 8.

Contains a discussion of the relation between the constituent parts of the British Empire.

British Fleet. **Robinson.**

The British Fleet: the growth, achievements, and duties of the Navy of the Empire. By Commander Charles N. Robinson. London: G. Bell & Sons, 1894. Size 8 × 5½, pp. xviii. and 560. *Illustrations. Price* 10*s*. 6*d*.

Chambers's Encyclopædia. ———

Chambers's Encyclopædia. A Dictionary of Universal Knowledge. New Edition. 10 vols. London and Edinburgh, W. and R. Chambers, 1888–1895 [1894]. Size 11 × 8. *Maps and Illustrations. Price* £5.

The geographical articles in this Encyclopædia have the advantage of being concise and up to date. All the larger articles are the work of specialists, whose names are given, and they are suitably, if not lavishly, illustrated.

Commercial Geography. *Z. Ges. Erdk. Berlin* **29** (1894): 271–289. **Hettner.**

Die geographische Verbreitung der Transportmittel des Landverkehrs. Von A. Hettner. *With Map.*

This is a very interesting chapter in physical geography dealing with the means of land-transport in all parts of the world, and illustrated by a map, on which are shown in colours the regions where trade is carried on by (1) railways; (2) waggons drawn by horses, mules, or oxen; (3) sledges drawn by oxen, reindeer, or dogs; (4) beasts of burden, horse, mule, ass, cattle, llama, sheep or goats, elephant, camel, reindeer; (5) human porters; and (6) by water.

Early Civilization. **Maspero.**

The Dawn of Civilization: Egypt and Chaldæa. By G. Maspero. Edited by A. H. Sayce. Translated by M. L. McClure. London: S.P.C.K., 1894. Size 11 × 7½, pp. xii. and 800. *Map and Illustrations. Price* 24*s*. *Presented by the Publishers.*

This is a work of exceptional importance. The immense number of illustrations, nearly 500, is of itself no small contribution to the popular study of ancient civilizations; and the fact that the use of the blocks has been specially lent by the French Government printers is a pleasing instance of modern international courtesy. The first chapter describes, under the title of "the Nile and Egypt," the ancient geography of the country, and refers to the cosmogony of the early Egyptians. Succeeding chapters deal with the gods of Egypt, the legendary history, and political constitution of early Egypt, the Memphite empire, and the first Theban empire. The last three chapters are devoted to Chaldæa, dealing in a similar way with the monuments of that phase of early civilization. We note, amongst some other anomalies of orthography, the use of the word "peninsular" for "peninsula."

Educational—Commercial Geography. **Gonner.**

Commercial Geography. By E. C. K. Gonner. London: Macmillan and Co., 1894. Size 7 × 5, pp. xi. and 206. *Price* 3*s*.

This book is divided into three parts: I. Commercial Geography and its principles; II. The Geography of the chief products and others; III. Countries, their Agriculture, Industries, and Commerce. The definition of Geography as "the study of the environments of Man" is a very wide one, being rather general than precise.

Educational—Commercial Geography. **Mill.**

Pitt Press Series. Elementary Commercial Geography. By Hugh Robert Mill. Second Edition. Cambridge: The University Press, 1894. Size 7 × 5, pp. 196. *Price 1s. 6d. Presented by the Author.*

Revised and greatly enlarged, with the addition of a full index.

Educational. **Frye.**

Primary Geography. By Alex. Everett Frye. London: E. Arnold [not dated]. Size 10½ × 8¼, pp. vii. and 127. *Maps and Illustrations.*

This beautifully illustrated quarto is a fair specimen of the fine work habitual in the school geographies in use in America; but the exclusively American standpoint which fits it so well for the purpose it was designed for may be found an obstacle in European schools. One column is devoted to the British Isles, and this includes two illustrations relating to other countries, while thirty-four columns are devoted to the United States, and less than half a column to Canada. The design of the book is as good as its execution.

Gazetteer. **Frey.**

Chambers's Concise Gazetteer of the World. Topographical, Statistical, Historical. London and Edinburgh: W. & R. Chambers, 1895 [1894]. Size 8 × 6, pp. 768. *Price 5s. Presented by the Publishers.*

This is by far the best general gazetteer of small size at present available. The articles, necessarily short, are carefully compiled, and contain a large amount of accurate information in a readily accessible form. It should not, however, be anonymous.

Geographical Year-book. **Wagner.**

Geographisches Jahrbuch, begründet 1866 durch E. Behm. XVII Band, 1894. . . . Herausgegeben von Hermann Wagner. Gotha: Justus Perthes, 1894. Size 9 × 6, pp. xii. and 464, maps, 28.

This year the subjects dealt with in detail in this invaluable summary are the following: Cartographical progress, with special reference to projections and the history of cartography, by Professor E. Hammer; Progress in our knowledge of terrestrial magnetism (1891–92), by Professor Karl Schering; Report on the progress of geographical meteorology (1891–93), by Professor Brückner; Report on ethnological researches (1891–93), by Dr. Georg Gerland; General maps of the official cartography of the chief countries, by Dr. Hermann Wagner; and Geographical literature relating to Europe, Introductory by Dr. Hermann Wagner, Southern Europe by Dr. Theobold Fischer, France by Dr. P. Camena d'Almeida, Switzerland by Dr. J. Früh, German Empire by Dr. Ludwig Neumann, Great Britain and Ireland by Dr. H. G. Schlichter, Netherlands and Belgium by Dr. H. Blink, Scandinavia by Dr. E. Löffle, European Russia by Dr. Anuchin, and Austria Hungary by Dr. Robert Sieger.

Methods of Sepulture. **Preuss.**

Die Begräbnisarten der Amerikaner und Nordostasiaten. Inaugural-Dissertation von Theodor Preuss. Königsberg, Braun und Weber, 1894. Size 8½ × 5½, pp. xviii. and 314. *Presented by the Author.*

An elaborate discussion of the methods of disposing of the dead employed amongst the primitive peoples of North-Eastern Asia and North America.

North Atlantic Directory. **Findlay.**

A Directory for the North Atlantic Ocean, comprising instructions, general and particular, for its navigation. By Alexander George Findlay. Fifteenth Edition. Revised and Edited by W. R. Kettle. London, R. H. Laurie, 1895 [1894]. Size 10½ × 6½, pp. xii. and 1006. *Charts. Presented by the Editor.*

The usefulness of this well-known book has been prolonged by careful revision, an[illegible] the addition of a certain amount of new matter. The account of the various islands i[illegible] the Atlantic contains much information of general interest, although the book as [illegible] whole is intended for the service of the practical navigator.

Travel. **Dewa[illegible]**

A Ramble round the Globe, by Thomas R. Dewar. London, Chatto and Windus, 1894. Size 8 × 5½, pp. xv. and 316. *Illustrations. Price 7s. 6d. Presented by the Publishers. Another copy presented by the Author.*

A humorous record of a holiday round the world.

NEW MAPS.

By **J. Coles**, *Map Curator*, **R.G.S.**

EUROPE.

Austro-Hungary. **Artaria.**

Artaria's Eisenbahn und. Post-Communications-Karte von Oesterreich-Ungarn, 1895. Scale 1 : 1,700,000 or 26·7 stat. miles to an inch. Verlag von Artaria & Co., in Wien. *Price* 1 *fl.* *Presented by the Publishers.*

England and Wales. **Ordnance Survey.**

Publications issued since December 8, 1894.

1-inch :—

ENGLAND AND WALES:—178, 179, 180, 181, 195, 210, 211, 212, 293, 294, 309, engraved in outline; 320, hills engraved in black and brown; 128, 172, hills photozincographed in brown, 1*s*. each.
SCOTLAND:—128, hills, 1*s*. 9*d*.

6-inch—County Maps :—

ENGLAND AND WALES:—**Lancashire,** 42, 2*s*.; 59 S.E., 63 S.W., 64 N.W., 68 N.E., S.E., 69 N.W., 70 S.W., 71 N.E., S.E., 76 N.W., S.W., 79 S.E., 80 N.E., S.W., S.E., 81 S.W., 83 N.W., 84 N.W., 85 N.E., S.E., 86 N.E., S.W., S.E., 87 S.W., S.E., 88 N.W., N.E., S.E., 91 N.W., 95 N.W., S.W., 101 N.W., 102 S.W., 103 N.W., 107 S.E., 111 N.W., S.E., 113 N.E., 1*s*. each. **Yorkshire,** 3, 169, 2*s*. 6*d*. each; 187, S.W., 201 N.W., N.E., 204 N.W., 215 S.W., 216 S.W., S.E., 217 N.E., 218 N.W., N.E., 229 N.W., N.E., 230 N.E., S.E., 231 N.W., S.E., 233 N.W., 244 N.W., 259 N.W., S.W., 271 N.W., 297 S.W., 1*s*. each.

25-inch—Parish Maps :—

ENGLAND AND WALES:—**Lancashire,** CV. 7, 10, 14*s*. each (coloured).

Town Plans—5-feet scale :—

London (Revision), IX. 10, 20, 30, 40, with houses stippled, 2*s*. 6*d*. each.

——— 10-feet scale :—

London—Re-survey (Hornsey Parish), III. 51-2, with houses stippled, 2*s*. 6*d*.

(*E. Stanford, Agent.*)

France. **Delebecque.**

Atlas des Lacs Français. Par A. Delebecque, Ingénieur des Ponts et Chaussées, Department de la Haute-Savoie. Part II. Ouvrage couronné par la Société de Géographie de Paris. *Presented by the Author.*

This is the second part of an important atlas of the French Lakes, the previous issue of which was noticed in the *Geographical Journal*, April, 1893. It contains maps of the following lakes:—Plate 8: Lac de la Motte, Lac du Grand Maclu, Lac de Chalain, Lac de Narlay, Lac Dessous, Lac Dessus, in the Department of Jura. Plate 9: Lac de Laffrey, Lac de Petit-Chat, Department of Isère, and Lac de la Girotte in the Department of Savoy. Plate 10: Lac d'Issarlés, Department of Ardèche; Lac du Bouchet, Department of Haute-Loire; Lac Pavin, Lac de la Godivelle d'en Haut, Lac de Tazanat, Lac Chauvet in the Department of Puy-de-Dôme. In addition to these, a corrected map, Lac d'Aiguebelette, in the Department of Savoy, is given.

On each sheet the latitude, longitude, level, and area of each lake are given. The depths are shown in different shades of blue, and by contour-lines for every change of five metres, the places where soundings were taken being indicated by dots. This atlas forms a valuable addition to our knowledge of the hydrography of Europe.

ASIA.

Indo-China. **Pavie.**

Carte de L'Indo-Chine, Dressée sous les auspices des Ministres des affaires étrangéres et des colonies par M.M. les Capitaines Cupet, Friquegnon et de Malglaive Membres de la mission Pavie. Scale 1 : 2,000,000 or 31 stat. miles to an inch. A. Challamel, Paris, 1895.

This is a revised and reduced edition of Pavie's map of Indo-China. It has been produced in the same style as the larger edition, and is a very good specimen of cartography.

AFRICA.

East Africa. **The Nyasa Company.**

Map of the district of Cabo Delgado, showing the route of the Nyasa Railway and the locations of the principal mineral discoveries, from the surveys of Mr. J. T. Last, leader of the Royal Geographical Society's Expedition, 1885, 1886, 1887. Scale 1 : 1,450,000 or 22·8 stat. miles to an inch. The Nyasa Company. *Presented by Col. J. Harris.*

North-East Africa. **Chaurand.**

Carta dimostrativa della Etiopia—Compilata dal Capitano di Stato Maggiore Enrico de Chauraud. Scale 1 : 1,000,000 or 15·7 stat. miles to an inch. Comando del Corpo di Stato Maggiore, 1894. 6 sheets. *Price complete*, 13 *lire. Presented by the Bureau de comptabilité du Corps d'Etat-major italien.*

When complete this map will consist of eight sheets. The six at present supplied comprise the country between lat. 7° N., and 19° N. and from long. 34° 40′ E. to 47° 10′ E. All boundaries and routes are laid down, and a large amount of detail is shown. The map is printed in three colours, water being shown in blue, routes in red, and lettering in black. There is no hill shading, but the principal elevations are indicated by crosses, and some of the heights are given in figures. This map, when completed, will be accompanied by an index.

AMERICA.

Alaska. **Lindenkohl.**

Der Küstendistrikt von Süd-Ost Alaska. Nach den Originalkarten der U.S. Coast Survey und der Geodetic-Survey-Commission, gezeichnet von A. Lindenkohl, Washington D.C. 1893. Scale 1 : 1,200,000 or 18·9 stat. miles to an inch. Petermann's 'Geographische Mitteilungen,' Jahrgang, 1894, Tafel 19. Gotha: Justus Perthes, 1894. *Presented by the Publisher.*

Guatemala. **Sapper.**

Die Republik Guatemala nach eigenen Aufnahmen gezeichnet von D. C. Sapper. Karte I. Reiserouten and Oro-Hydrographie. Karte II. Geologische Übersicht. Karte III. Verbreitung der Vegetations Formationen. Scale 1 : 900,000 or 14·2 stat. miles to an inch. Petermann's 'Geographische Mitteilungen,' Ergänzungsheft No. 113, Tafels 1, 2, 3. Das Flussgebiet des Rio Polochic, entworfen von D. C. Sapper, Juni, 1892. Scale 1 : 600,000 or 9·5 stat. miles to an inch. Petermann's 'Geographische Mitteilungen,' Ergänzungsheft No. 113, Tafel 4. Gotha: Justus Perthes, 1894. *Presented by the Publisher.*

GENERAL.

Educational. **Hickmann.**

Prof. A. L. Hickmann's geografisch-statistischer Taschen-Atlas. 16–20 Tausend. Wien: Verlag der kartografischen Anstalt G. Freytag and Berndt. *Price* 3 *marks. Presented by the Publishers.*

The special feature in this little atlas is the extensive use that is made of diagrams to illustrate comparative statistics. It contains physical, political, and ethnographical maps, and statistics in tabular form.

The World. **Kiepert.**

Kiepert's grosser Hand-Atlas. Neue Lieferungs-Ausgabe in 45 Karten. Ausgabe in 9 Lieferungen à 5 Karten mit statistischem Material und Namen-Verzeichnis mit Bevölkerungsziffern zu jeder Karte. Die statistischen Angaben von Dr. Paul Lippert, Bibliothekar des Kgl. Preuss. Statist. Bureaus. Part 7. Berlin: Geographische Verlagshandlung Dietrich Reimer. Inhaber: Hoefer and Vohsen. *Price of each part*, 4 *marks. Presented by the Publishers.*

Sheet No. 2 is a map of the Eastern Hemisphere; No. 5 is a general map of Germany, with an inset on an enlarged scale of Berlin and its environs; No. 37, a general map of Africa, with inset on an enlarged scale of the Cape Colony; No. 44 is a map of Central South America, with insets of Central Ecuador and Rio Janeiro and environs; No. 45, Chile and the Argentine Republic, with plans of Buenos Ayres and Monte Video, and an inset map of the central part of Chile. Each map is accompanied by explanatory letterpress, and an index which gives the population of all important places.

Historical Geography. **Schrader.**

Atlas de Géographie Historique. Ouvrage contenant 54 grandes cartes doubles en couleurs, accompagnées d'un Texte historique au dos et d'un grand nombre de cartes de détail, figures, diagrammes, etc. Par une Réunion de Professeurs et de savants sous la direction géographique de F. Schrader. 14e Livraison. Paris: Librairie Hachette et Cie. 1894. *Presented by the Publishers.*

Part No. 14 of this Atlas contains the following maps: Syria after the death of Solomon, about the year 927 B.C.; the Eastern World about the middle of the ninth century, B.C.; Asia Minor in the ninth century, B.C.; the Roman Empire at the close of the fourth century; the progress of Christianity since the year 400; Palestine in the time of Jesus Christ; a simplified reduction of the "Catalan map," and a map embracing the same area beneath it for reference. The maps are all very nicely drawn, and are accompanied by excellent explanatory notes, which are illustrated by maps.

CHARTS.

Admiralty Charts. **Hydrographic Department, Admiralty.**

Charts cancelled in September and October, 1894.

No.	Cancelled by	No.
2613 France, north coast. Sheet XI.	New Plan. Cape Levi to Fécamp	2613
2612 France, north coast. Sheet XII. 2611 France, north coast. Sheet XIII.	New Chart. Fécamp to Boulogne	2612
507 Unare and Piritu bays. 506 Pampatar and Moreno bays, and part of Laguna Grande del Obispo. 510 Port of Mochima. 511 [illegible] and [illegible] bays. 384 Plan of [illegible] harbour, Cumana anchorage, San Juan Griego bay, Esmeralda bay, Carupano bay, Puerto Santo bay, and Coche island anchorage on this sheet. 512 Port el Roque. 395 Plans of Bahia Honda, Tucacas, San Juan bay, Port Turiamo, Puerto Chichiriviche, and Port el Roque on this sheet.	New Chart. Ports and anchorages on the north coast of South America	[illegible]
680 Ngonsi road and Vonondi bay. 682 Hastie road and Port Choiseul. 685 Tangtang harbour.	New Chart. Plans on the east coasts of Madagascar . . .	680
738 Haufela bay.	New Chart. Haufela bay	738
2722 Plans of Pulo Panjang, and Pulo Wai on this sheet.	New Chart. Plans in Gulf of Siam . .	[illegible]
1570 Malo island to Efate island.	New Chart. Malo Island to Efate Island . . .	1570

Charts that have received Important Corrections.

No. 2040, England, south coast:—The Solent, Hurst point to Cowes and Southampton Water. 2330, Norway:—Sheet IV., Svenör to Koster islands.

including Christiania fiord. 2322. Netherlands:—Scheveningen to Ameland, including the Zuider Zee. 2302, Gulf of Bothnia:—Sheet 7, Tome point round the head of the Gulf to Tauvö. 2296, Gulf of Bothnia:—South Quarken to Hornslandet. 2215, Gulf of Finland:—Kronstadt, north and south channels. 2115, Denmark:—The Sound. 790, Denmark:—Approaches to Copenhagen, with Drogden and Flint channels. 2664, France, west coast:—Sheet 2, D'Arcachon point to De la Coubre point, including river Gironde to Bordeaux. 2292, Black Sea:—Akmechet harbour. 1853, South America, west coast:—Callao harbour. 1390, Africa, east coast:—Chale point to Pangani, including the island of Pemba. 6a, Gulf of Aden:—Sheet 2, western portion. 2766, New Guinea:—North-east coast of New Guinea, with Bougainville, New Britain, New Ireland, Admiralty islands, and off-lying reefs. 1579, New Hebrides:—Malekula Island, southern part.

J. D. Potter, agent.

Pilot Charts. **U.S. Hydrographic Office.**

Pilot Chart of the North Atlantic Ocean for December, 1894, with supplement giving the weather conditions on the North Atlantic Ocean for Six Days.—Pilot Charts of the North Pacific Ocean for December, 1894, and January, 1895. Published at the Hydrographic Office, Bureau of Navigation, Department of the Navy, Washington, D.C., Charles D. Sigsbee, Commander, U.S.N. Hydrographer.

PHOTOGRAPHS.

France, Switzerland, Tonkin, etc. **Jackson and Others.**

171 Photographs of France, Switzerland, Tonkin, and Anam. *Presented by Mr. James Jackson.*

This is a series of 171 photographs, 150 of which have been taken by Mr. James Jackson in France and Switzerland, and 21 presented by the same gentleman, are views of Tonkin and Anam. Mr. Jackson has been one of the largest contributors to the Society's collection, and these photographs, like others he previously presented, are excellent specimens of photography.

Iceland. **Grossmann and Cahnheim.**

150 Photographs of Iceland, taken by Dr. Karl Grossmann and Otto Cahnheim in 1892. *Presented by Dr. Karl Grossmann.*

This series of photographs was taken by Dr. Karl Grossmann and Mr. Otto Cahnheim during their visit to Iceland in 1892. They are well chosen to illustrate the geological features and scenery of the country, as well as incidents of travel in Iceland.

Malay Peninsula. **Becher and Others.**

121 Photographs of the Malay Peninsula, taken by the late Mr. H. M. Becher, and others. *Presented by Gen. S. Becher.*

This is an excellent series of photographs of the people, scenery, mining works, etc., of the Malay Peninsula, most of them having been taken by the late Mr. H. M. Becher, who was unfortunately drowned in 1893 while attempting to reach a mountain in the interior of the Malay Peninsula called Gunong Tahan.

Norway. **Mockler-Ferryman.**

17 Photographs of Norway (Hardangar, etc.), taken by Captain A. F. Mockler-Ferryman in 1894. *Presented by Captain A. F. Mockler-Ferryman.*

This is a series of views taken by Captain A. F. Mockler-Ferryman in Norway during the past year in the Hardangar district. They are well chosen to illustrate the scenery and physical features of the country.

Palestine. **Robinson Lees.**

10 Photographs of Palestine, taken by G. Robinson Lees, Esq. *Presented by G. Robinson Lees, Esq.*

This is a very interesting series of photographs presented by Mr. G. Robinson Lees to the Society.

N.B.—It would greatly add to the value of the collection of Photographs which has been established in the Map Room, if all the Fellows of the Society who have taken photographs during their travels, would forward copies of them to the Map Curator, by whom they will be acknowledged. Should the donor have purchased the photographs, it will be useful for reference if the name of the photographer and his [illegible]ess are given.

The

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THE BRITISH CENTRAL AFRICA PROTECTORATE.*

By H. H. JOHNSTON, C.B., H.M. Commissioner in British Central Africa.

Four years ago I had the honour of addressing the Royal Geographical Society on "British Central Africa." To-night I have been invited to read another paper before you, and this time its title is "The British Central Africa Protectorate," which will show you that in four years the geographical interest of this country has become largely increased by political developments. That, indeed, is one of the chiefest features of interest attaching to the Royal Geographical Society; the measures which it takes to enlighten the public mind on the subject of geography so often lead, by a natural and proper sequence, to an increased political interest being taken in regions which, but for the strenuous efforts of this Society, would have been little if at all known to the British public, and this increased political interest not unfrequently receives the Government's seal and sanction by the incorporation of these recently discovered regions within the mighty scope of the British Empire.

There are still happily among us, and no doubt present in this audience to-night, not a few persons who have listened to the wonder-tales of Livingstone, Burton, Speke, and Grant; possibly also to the addresses of Barth and Baikie. Would it not have added one hundred-fold to the interest with which they hung on the words of these remarkable explorers had they known that before many decades had elapsed the greater part of the Zambezi, the lakes of Nyasa, Mweru, Bangweolo, and a portion of Tanganyika, would have been included within the British Empire; that the kingdom of Buganda would have become a

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* Paper read at the Royal Geographical Society, November 12, 1894. Map, p. 288.

British Protectorate; and that the seemingly wild predictions of Dr. Barth and the hopes of Dr. Baikie would have been realized in the placing of the richest regions of the Niger and the Benue under a British Protectorate and a chartered company? These reflections, therefore, may perhaps enhance our interest in the proceedings of this Society, and the researches of explorers will be more eagerly followed than heretofore, because of the possible relation they may bear to the empire that we are at last beginning to value and to understand.

In my remarks to-night I am going to credit my audience with a fairly retentive memory. I shall assume that a large proportion of those persons present either listened to my address of four years ago or read it when printed in the Society's *Proceedings*, and I shall endeavour not to fatigue you with a twice-told tale, but to take up other phases of the British Central Africa Protectorate not dealt with in my earlier paper; and as I have little fresh to say from personal observation about the sphere of influence beyond the Protectorate, I shall confine my remarks to a more minute description of certain districts within the limits of the Protectorate; for you must understand that in British Central Africa there is a distinction between the regions round Lake Nyasa, which are known as the British Protectorate, and the countries to the west and north, which are within the British "Sphere of Influence." The Protectorate is administered by the Imperial Government through its Commissioner and Consul-General, and the Sphere of Influence beyond is supervised by the British South Africa Chartered Company through the same individual.

I had visited this country, as you know, in 1889 and 1890; I returned there to found an administration in the early summer of 1891. I will try in a few words to sketch out the conditions of the Protectorate, political and otherwise, as I found it when I landed at Chiromo on July 16, 1891. The Lower Shire district was still in the possession of the Portuguese, though it was to be handed over to us in pursuance of the Anglo-Portuguese Convention. This was a marshy country, with only one European occasionally residing at a half-formed station, and with a native population scarcely exceeding one thousand. The country had become almost uninhabited through the raids of certain of the Makololo chiefs and some powerful tribes north of the Zambezi in rebellion against the Portuguese. The Ruo district was fairly quiet, and the town of Chiromo had just been founded, and consisted of five reed houses and one street. In the Mlanje district there was practically chaos. The chiefs of the aggressive Yao tribes (of whom more anon) had taken complete possession of this rich district, the few European planters were menaced in their lives and property, and the only mission station had to be abandoned. In the Zomba district incessant slave-raids were being carried on by a Yao chief named Kawinga. One of these, undertaken in May, 1891 (as stated by the Rev. Horace Waller on good authority), resulted in the expatriation of over a thousand people. At the settlement of Zomba itself there was just the unfinished Consulate-General and Mr. Buchanan's house hard by. In the Blantyre district matters were more settled, owing to the greater number of the Europeans being established there; but here again the Yao chiefs did pretty much as they pleased, and slave-trading and raiding went on openly. The West Shire district was also in a very disturbed state. The principal chief of the Makololo had been deposed by his brother chiefs, and was fighting with them. There were also constant incursions of the Makanga from over the Portuguese border. On the Upper Shire the slave-traders had things entirely their own way, and traders and European passengers were obliged to pass up and down the river very discreetly, lest by seeming to take any notice of the slave-traders' proceedings they should have the river closed against them by the Yao chiefs. As regards the South Nyasa district, continual warfare was going on between Mponda and Zarafi, two rival Yao chieftains, and also between the Yaos and the Angoni, with the result that the slave-traders from the coast prospered mightily, and slaves to the extent of one to two thousand were exported annually. Mponda, though not unfriendly to the English, used, either personally or through his head men, to levy a tribute from the steamers passing into Lake Nyasa, which was undefined and sometimes oppressive. On the south-east and south-west coasts of Lake Nyasa, Makanjira, the

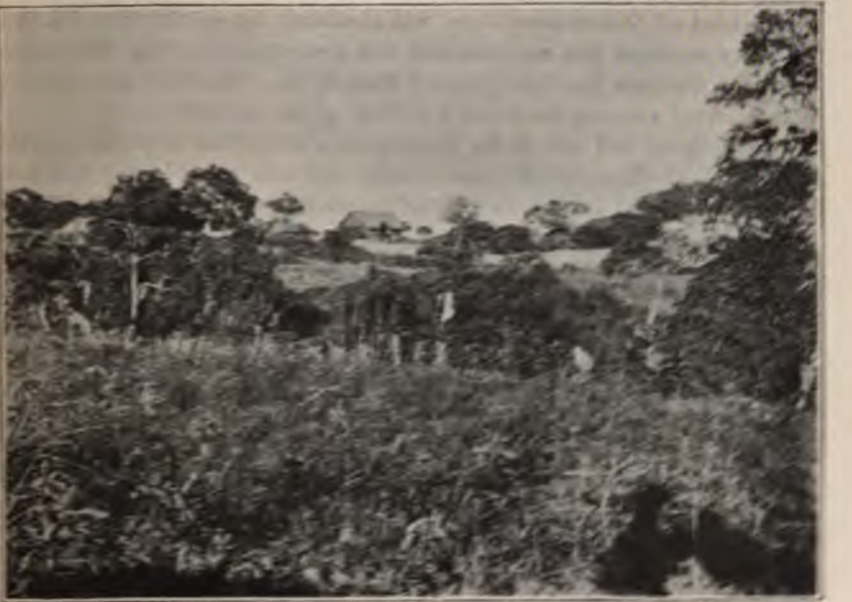

FIG. 1.—VIEW FROM THE RESIDENCY GARDEN, ZOMBA.

most powerful of all the Yao chiefs, practically ruled the country, and conducted incessant wars to the west of Lake Nyasa for the purpose of supplying the slave-market. Jumbe's country was quiet except for the attacks of Makanjira, and Jumbe was, I believe, honestly endeavouring to act up to the treaty he had concluded with Her Majesty the Queen, and by degrees to put down slave-trading in his country. Nevertheless, the land was so full of Arabs that his efforts were not of much avail. In the West Nyasa district fighting was continually going on between the Angoni in the interior and the Atonga on the coast. In the North Nyasa district the Arabs had things completely their own way, and were beginning to reconsider the advisability of breaking the treaty of peace which they had entered into with me in 1889. In short, throughout all this country there was absolutely no security for life and property amongst the natives, and not over-much for the Europeans except in districts like Blantyre and West Nyasa, where the missionaries had acquired a strong hold over a section of the population.

Everything had got to be commenced; there was no proper postal service, there were no customs-houses, no roads suitable for wheeled traffic, very little labour in the coffee plantations; the forests of the land were being steadily destroyed year by year by bush fires, and the navigation of the Upper Shire was entirely at the mercy of evil-minded slave-traders.

Our first attempts were naturally directed towards the establishment of something like law and order in the districts more immediately contiguous to European settlements. In carrying out these objects, I was supported by a staff which consisted of Mr. Alfred Sharpe, who had been appointed Vice-Consul and Deputy-Commissioner by Her Majesty's Government; of Captain Maguire, who was lent by the Indian Government; of Captain Sclater, R.E., and three non-commissioned officers of the Royal Engineers, lent by the War Office; of Mr. Alexander Whyte, who came out as naturalist; and of Mr. Vice-Consul Buchanan, together with one or two others engaged in the country, and who afterwards became permanently attached to the Administration. We had a police force of seventy Sikhs and one hundred Zanzibaris. Finally, there were two gunboats—the *Herald* and the *Mosquito*—already placed on the Zambezi, which were instructed to afford me assistance in the transport of my expedition from Chinde to Chiromo. As Chiromo is often mentioned in this paper, I might explain that it is an important place situated at the junction of the river Ruo with the Shire. Above Chiromo both banks of the Shire are British; below Chiromo one bank is Portuguese and the other British. The river Ruo is part of the boundary between the two powers. Captain H. J. King was senior naval officer on the Zambezi, and afforded me very great assistance both on the Lower and Upper Shire.

Our expedition had no sooner landed at Chiromo, on July 16, 1891, than urgent representations were received from the few planters who had attempted to settle in the Mlanje district. The Yao chief Chikumbu, who had long been giving trouble by attempting to conquer the country from its possession by the indigenous chiefs, had at length menaced the European planters so seriously that all work on their plantations had come to an end. Chikumbu's object was to conquer and enslave the A-nyanja people, who are the original inhabitants of the country. The head chief of the A-nyanja had recently died, and before his death had appealed to Mr. Buchanan, then acting consul, for protection, and on his death-bed transferred his country to the Queen, as the only means of keeping it out of the hands of the Yaos. I accordingly despatched Captain Maguire, with a small force of Sikhs, to Mlanje to bring Chikumbu to reason, to remind him of the terms of his own treaty with the English, and to request him to cease annoying the planters, and not to transgress the boundaries of his country already laid down by Mr. Buchanan. Chikumbu, however, commenced by attacking the small force sent to support Captain Maguire, and, as the result, was driven from his country, and his brother installed as chief in his stead. This action may be said to have definitely opened the Mlanje district to European settlement. The Scotch mission was re-established, and numerous planters came and settled on the land, much to the advantage of the natives, who at once began to prosper from the demand for

FIG. 2.—VIEW NEAR MURCHISON FALLS.

labour. We had now definitely fulfilled our promise of protection to the A-nyanja people; but in the course of three years we had to fight twice with the Yao chiefs, who dominated the northern part of Mount Mlanje, and who did not give up the slave-trade without a struggle.

Following on this Mlanje expedition came the necessity of taking measures to prevent the carrying on of the slave-trade at the south end of Lake Nyasa. I need not unnecessarily weary you by recounting in detail these operations; I may briefly state that Captain Maguire and myself with 70 Sikhs tried conclusions with the Yao chiefs Mponda, Makandanji, and Makanjira, and completely defeated them. We had started on this expedition with the idea that the only enemy we should have to contend with by force would be Makanjira, but before reaching Makanjira's a conflict was forced on us by Mponda. The result was disastrous to the latter, whose forces, though large, were completely defeated and dispersed by the remarkable military skill and gallantry of Captain Maguire and his small force of Sikhs. As the result Mponda made peace, and we have never had occasion to fight with him since. Captain Maguire built a fort on the uninhabited shore of the Shire immediately opposite Mponda's town, on the south end of the lake, and named it after myself. We then effected a landing at Makanjira's, and, after two days' fighting, captured his principal town and destroyed it, together with three of Makanjira's dhows, which were used in ferrying slaves across the lake. On our return, we exacted from the Yao chiefs on the Upper Shire engagements to put an end to the slave-trade. We were then obliged to turn to Kawinga, a powerful Yao chief living 18 miles to the north-east of the residency at Zomba, to whose extensive slave-dealing I have already made allusion. Kawinga at first refused any concession to our demands, but after losing several of his villages he consented to treat, and, although his behaviour has been far from satisfactory since, at any rate he does not attempt any longer to openly raid the country in the vicinity of Zomba. Unfortunately, we were unable to effect, on that occasion, a complete mastery over Kawinga, owing to Captain Maguire being wounded in action, and the whole of the native porters who were carrying the ammunition bolting, thus obliging Captain Maguire and Mr. Buchanan, who was with him, to effect a retreat whilst the enemy was still in flight.

For awhile it seemed as though the tide of our good fortune had turned. Captain Maguire rapidly recovered from his wound, but insisted on making a hasty trip to the south end of Lake Nyasa to renew the garrison at Fort Johnston. On arrival at that place, however, he received information of the arrival of a large slave-caravan on the south-west coast of Lake Nyasa, which was to proceed to Makanjira's. On going up in the steamship *Domira* to surprise this caravan, he decided first to intercept and destroy Makanjira's two remaining dhows. These vessels had been anchored in shallow water near the main town of Makanjira's, which we had destroyed a few months before. Captain Maguire would have succeeded safely in his purpose had it not been that a storm arose, which drove his boats from their mooring and dashed them on to the rocks, at the same time driving the *Domira* aground. The attack of the enemy then became overpowering. Captain Maguire and three of his Sikhs were killed; all the Europeans on the *Domira* were more or less wounded; and, as you know, the further tragedy occurred of Makanjira luring the principal engineer and the Parsee doctor on shore under a flag of truce, and then murdering them. After lying for five days on the sandbank exposed to a galling fire on the part of the enemy, the *Domira*, by some happy chance, floated off and managed to steam away. The saving of the *Domira* was mainly due to the remarkable skill and bravery of Mr. Angus Urquhart, a Scotch engineer, who, though severely wounded, worked for five days defending his ship and attempting to get her off the sand-bank.

FIG. 3.—RAPHIA PALMS.

Shortly after this disaster, all the unfriendly Yao chiefs at the south end of Lake Nyasa rose against us, Mponda alone remaining faithful. To relieve the state of siege in which Fort Johnston was practically placed, Mr. J. G. King and Dr. Watson attempted to make a sally into Zarafi's country, Zarafi being our chief persecutor. The small band of Europeans and Sikhs, however, were attacked by Zarafi's forces in a defile, and only emerged from their dangerous predicament with the loss of six Sikhs, and with all the Europeans severely wounded. This mishap was caused in much the same way as the check at Kawinga's, by a panic ensuing among the native porters. From incidents like these, we came to realize the absolute necessity of the maintenance of a sufficiently strong force of Sikhs to provide against the possibility of similar panics. Negro troops are splendid in *élan* and dash at the onset, but the slightest check will turn a mad rush onward into a frantic panic backwards. It is on occasions like these that the Sikhs are invaluable, as they remain perfectly unmoved, and obey their officer's orders with the same calm precision as they would do on the parade-ground.

I have alluded to our Indian forces under the general term of Sikhs, but I should explain that twenty-two of them were really cavalrymen from the Haiderabad Lancers, and they, being found unsuitable to a country which at that time possessed few or no horses, were sent back to India; so that, what with deaths and wounded men, our active forces were reduced to forty men, supplemented by the hundred Zanzibaris to whom I have made allusion, these latter, however, being employed chiefly as civil police. It became necessary, therefore, to merely hold on to such positions as we had secured, and let our struggle with the slave-traders fall into abeyance. This miserable state of affairs was endured until Her Majesty's Government put three gunboats on to Lake Nyasa and the Upper Shire; and also until our force of Sikhs was so far strengthened as to permit us to definitely take the field against Makanjira and the Yao coalition. Prior to the arrival of this help, however, the slave-trading chiefs on the Upper Shire had broken out into open hostilities, and for one month cut off our communications between Lake Nyasa and the lower river. We had to meet these hostilities with a handful of black police, until such time as a detachment of blue-jackets from the gunboats on the lower river could come to our assistance. We were also helped by Baron von Eltz and the Sudanese belonging to the German expedition. The outcome of this campaign, so unwillingly entered upon, was the complete conquest of the Yao chiefs on the Upper Shire, where there has never since been any further fighting or trouble, and where the old A-nyanja population has resumed its old place in the country. It is interesting, also, to note that our local police force in the Upper Shire is now mainly composed of the very Yaos that we were fighting against only a year and a half ago. There has scarcely been a more amusingly complete instance of the principle of setting a thief catch a thief than the turning to account of the warlike instincts of ese Yaos. This happy result is largely due to the tact and management f Mr. F. J. Whicker, and to my old Swahili head man, Ali Kiongwe.

The considerable increase to the forces at my disposal enabled me, in e autumn of 1893, to undertake and carry out the complete conquest f Makanjira. We first drove him from the west shore of the lake, which e had recently seized, and then attacked him in his own country and ptured every one of his towns in succession, finally reducing him to e for terms. Since that time his country has been occupied and ministered by the British, as the only means of completely suppressing e slave-trade in that direction. A large fort has been built on the te where poor Maguire was killed, and has been fitly named after him ort Maguire.

This campaign against Makanjira did not, I think, attract from the ublic at large the attention that it deserved. I am not referring to y own share in the matter, which has probably been over-estimated; am referring to the really remarkable services rendered by Mr. Alfred harpe, Major Johnson, Major Edwards, and Captain Robertson, not to ention more particularly the other Europeans engaged, or the renewed ts of gallantry on the part of the Sikhs. Some of Mr. Sharpe's forced arches and his extraordinary acts of pluck and daring in effecting connaissances or in bringing relief at critical times, deserve a special isquisition were it not that they are such common incidents in the cords of British officials and naval and military officers, that they xcite but a feeble interest on the part of the much-engrossed home ublic. The successful issue of the Makanjira campaign seems, for the resent, to have solved most of our difficulties in Southern Nyasaland. was followed up by some energetic action on the part of Captain H. Manning in the Mlanje district, which resulted in a general eacemaking all round amongst the recalcitrant Yao chiefs. We are, erefore, now left without enemies in the whole Protectorate, with the xception of one or two Arabs at the north end of Lake Nyasa, and arafi and Kawinga on our south-eastern border. I have every reason hope that Kawinga may fall into our ways and give up the slave-ade; but I fear Zarafi will yield to no argument but that of force, ough as an enemy he is now contemptible, since he is deprived of the -operation of Makanjira.

But in the prosecution of this work in our Protectorate, peace had r victories no less than war. Captain Sclater and others have under-ken the construction of a series of admirable roads which are suitable r wheeled traffic, and where waggons are now industriously plying. I o not mean that before our arrival there were no roads in the country, ut these roads were little more than widened native paths, and, with e exception of those passing through the town of Blantyre, there ere no bridges over the streams.

Courts of justice have been established at Chiromo, Blantyre, Zomba, Fort Johnston, Deep Bay, and many other places. A regular postal service is now in operation, not only throughout the Protectorate, but right away to Mweru and the borders of the Congo Free State. A telegraph-line is being constructed by the African Trans-Continental Telegraph Company, and this, it is hoped, will shortly be completed through from Blantyre to Fort Salisbury across the Shire and Zambezi. In all this task of organization, however, it is by no means the Administration alone and unaided that has done the work. To begin with, the bases of the whole Protectorate were laid years ago by patient missionaries and by one or two dogged Scotch planters, who had a firm belief in the future of Nyasaland and a resolve to be dismayed at nothing, not even utter want of capital. One of the biggest names in this country for all time will be that of John Buchanan, whom Lord Salisbury recommended for a C.M.G. long before his merits were known to the public at large. Mr. Buchanan practically introduced the cultivation of the coffee-tree into this Protectorate, and so laid the foundations of its present prosperity; he also commenced the cultivation of the sugar-cane and the manufacture of sugar, the cultivation of tobacco and the manufacture of cigars; he has made successful experiments in the introduction of the cinchona-tree and the tea-shrub, of various kinds of indiarubber, and latterly has co-operated with the Administration in taking up the cultivation of wheat, which is likely to prove a very great success. In regard to this last-named product (wheat), it may be of interest to describe our own experiments in this matter. We introduced wheat from England and wheat direct from India, but neither proved very successful. It then occurred to Captain Sclater to obtain specimens of the wheat grown on Tanganyika by the French missionaries. This wheat was originally of Indian origin, but had become practically acclimatized to Central Africa. Its introduction into the Shire highlands has been a great and unqualified success. The Administration first planted a small area at Zomba and at Blantyre, and distributed the seed thus gathered in to Mr. Buchanan and to certain of the more enterprising among the native chiefs. The results of these measures, taken under the guidance of our naturalist, Mr. Whyte, have met with a full and ample success, and before long we may reasonably hope to discontinue importing any flour from outside.

The missionaries have, as I once before pointed out, acted as a kind of informal school board for Central Africa, and the results of their years of patient teaching have begun to manifest themselves since we commenced the administration of this country. An increasing number of natives are able to read and write, and, above all, are trained to respect and to value a settled and civilized government. As one or two instances of the really marvellous and encouraging results of this missionary teaching, I may quote the following. The whole of our

Government printing at Zomba, including the production of our Gazette, is done by native printers taught in the schools of the Universities Mission and of the Church of Scotland Mission. The other day my far-sighted colleague, Mr. Sharpe, resolved to try what could be done in the way of creating a staff of native telegraph operators; he accordingly obtained an intelligent boy knowing absolutely nothing of telegraphy, but well taught in other ways, from the Universities Mission. He put this boy under one of the Sikhs who was acquainted with the working of the telegraph, and in six weeks the Sikh had imparted sufficient knowledge to this native to enable him to send messages with extraordinary correctness, and to become the telegraph operator at Blantyre.

FIG. 4.—A VIEW OF MORAMBALA MOUNTAINS FROM THE SHIRE RIVER.

Amongst other important aids to civilized and comfortable existence, I should mention the introduction of the cultivation of the potato, which is due either to Mr. Buchanan or to the Scotch missionaries, or to both; and in the same way the introduction of orange-trees, lemon-trees, roses, strawberries, almost all European vegetables, and many beautiful garden flowers and shrubs. The Administration also may claim some credit for its attempts, through Mr. Alexander Whyte, to introduce interesting and valuable plants and trees. Mr. Whyte, however, has made his special mark in his botanical discoveries. His name will be handed down to fame in connection with one of the most interesting conifers in the world, namely, the great cedar of Mount Mlanje, which is called the *Widdringtonia Whytei.* Between the limits of the South Africa region and the highest mountains of Abyssinia (with the exception of some small Juniper bushes on Mount Kenia) there is no such thing as a conifer in Central Africa, except the recent discoveries on the high mountain of Mlanje and on the highest peaks of Abyssinia. In the autumn of 1891, whilst we were fighting on Lake Nyasa, Mr. Whyte was exploring the higher plateaux of the Mlanje mountain mass. A Scotch missionary, now dead, the Rev. Robert Clelland, had reported that there were trees growing in the upper parts of Mlanje which looked like cypresses. Mr. Whyte, however, was the first to actually prove this assertion, and to send specimens for examination. The *Widdringtonia Whytei* is not only a remarkably handsome tree, attaining occasionally an altitude of 130 feet, but its timber, which smells like cedar wood, is exceptionally good. We are now taking measures to replant this tree throughout the Shire highlands, where it once no doubt existed before it was extirpated by bush fires. Seeds have been sent to England and have germinated there, and four plants are at the present time growing at Mr. Veitch's nurseries.

One result of all this improvement in government was a considerable influx of European planters resolved to try their fortune in coffee-growing. In 1891 the total white population of British Central Africa was 57; at the beginning of the present year it had risen to 230, and it is now considerably over 300. The trade of this country in 1891 amounted to a total value of about £20,000. It now exceeds £100,000. In 1891 there were only 8 British steamers on the lakes and rivers, and perhaps 15 barges. There are now 17 steamers and about 120 barges or sailing vessels hoisting the British flag. There were a thousand acres under cultivation at the hands of Europeans in 1891, and it is estimated that this area has increased to eight thousand acres in the summer of this year. Over five million coffee-plants are now growing, and when these come into bearing, as they will before long, there will be ample freight for the railway which it is proposed to construct between the Upper and the Lower Shire. In 1891 there was one Indian trader on British territory; there are now twenty-seven, and some of these men are doing such a prosperous business that they are able to pay as much as £140 for a single town lot. Land, which was selling at from ½*d.* to 3*d.* an acre in the first half of 1891, now ranges in price from 1*s.* to 5*s.*, and in the townships has risen to sums of £100 to £200 for township lots. Since the Administration commenced, four "towns" have been created and eight centres of European settlement have been founded, which before long will have attained, no doubt, to the dignity of townships.

For the past three years we have been at work surveying thi country, and this work has been carried out mainly at the expense of he Royal Geographical Society, who has lent us the instruments. All ur principal stations are now protected by forts, and a large native opulation has sprung up around each of these forts, owing to the omplete sense of security they convey. It is remarkable how the very dea of slavery is disappearing from among the indigenous people. It as been throughout most gratifying, the way in which four-fifths of he inhabitants have fought on our side to maintain the principle of iberty. The remaining fifth may be considered to consist of more r less Muhammadanized negroes, who are under the influence of the rabs. Many of these are now being weaned from their evil ways, ecause they are not slow to appreciate the advantages of serving for egular pay in our police force, or of carrying on trades at once more ucrative and honourable than that of kidnapping their fellow-men; but, s I have already pointed out, there are still one or two strongholds of he old *régime*, and I should not like to dwell in "a fool's paradise," r imagine that we are to carry out the steady suppression of the slave-rade by edicts alone.

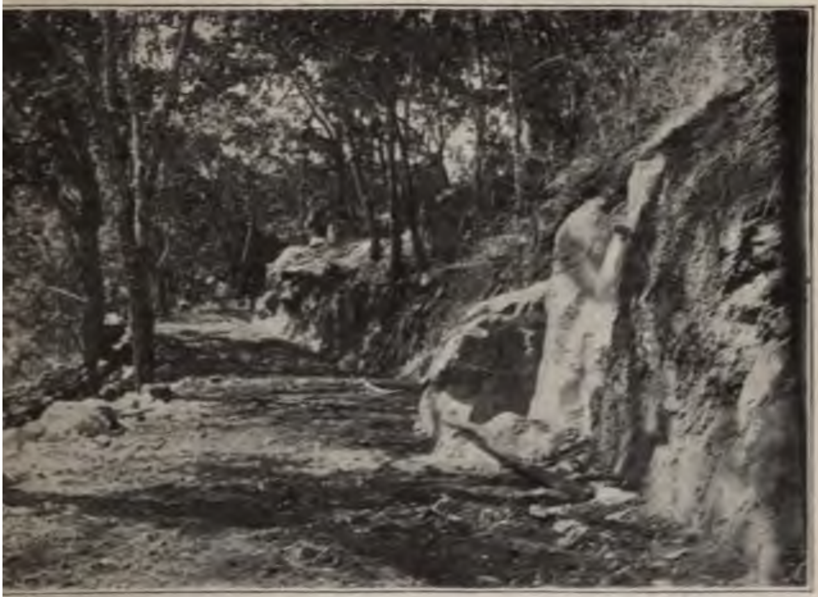

FIG. 5.—SCLATER'S ROAD.

The chief value of the British Central Africa Protectorate, compared the adjacent countries, lies in the greater proportion of high land ver low swampy country. I should say, roughly speaking, that about our-fifths of its land-surface is 3000 feet and upwards above the level of the sea, and about one-fifth is between 5000 and 10,000 feet. The immediate result of this elevation of the land is the prevalence of a much cooler climate than is usually found in Central Africa so near the Equator. There are, indeed, easily attained portions of British Central Africa where the heat is never oppressive, even in the hot season, and where in the cold season bitter frosts prevail. Unfortunately, it is impossible to reach this delectable land from the coast without traversing the hot and unhealthy valleys of the Zambezi and Shire, and within the Protectorate itself one must at times descend to the shores of Lake Nyasa or the marshy land around Lake Chilwa, and thereby receive the germs of malarial fever.

There is an average rainfall of 55 inches throughout the Protectorate, but it is not altogether uniform in character, some districts receiving about 75 inches, and others not more than 35 inches. Still, it is decidedly a well-watered country, endowed with many perennial streams, only a small number of which dry up in the height of the dry season. Consequently, it is a land which can almost everywhere be irrigated during the dry season, and can thus grow a continual succession of crops. The water in almost all places is wholesome to drink; in fact, I should say, that among the most charming features of British Central Africa are the innumerable streams of cold clear water, with the umbrageous forests that they give rise to along their banks.

The great attraction of this country lies in its beautiful scenery, in its magnificent blue lakes, its tumultuous cascades and cataracts, its grand mountains, its golden plains and dark green forests. A pleasant and peculiar feature also of the western portion of the Protectorate is the rolling grassy downs, almost denuded of trees, covered with short turf, quite healthy and free from the Tsetse fly; these no doubt will in the future become actual sites of European colonies, districts in which Europeans can rear their children under healthful conditions.

It would be difficult, in the short space of time at my disposal, to give you an adequate idea of all the aspects of Nyasaland scenery, so I will confine myself to briefly describing the salient features of some of the more striking landscapes.

As an illustration of our mountain scenery, let me take Mlanje, a mountain mass which in its highest pinnacles just reaches 10,000 feet. Mists often gather round this splendid range and completely efface it during the first half of the day, so that you may be approaching nearer and nearer to it across the heated yellow plain without being aware of its existence, till all at once the mists are dispelled, and a great blue wall surmounted by peaks and turrets suddenly blots out half the sky. As you look up a sheer seven to eight thousand feet, the effect is very grand. At the base of Mlanje there are many streams and a wealth of vegetation, among which may be seen the beautiful Raphia palms, the wild date, and a curious species of cycad. Ascending through this lush tropical vegetation—group after group of feathery palms extorting one's admiration—one enters upon a rolling slope covered with high grass about 6 feet high, with stems stout and strong, through which it seems at times almost impossible to force one's way. Then supervenes a belt of tree ferns, more lovely perhaps than any other form of vegetation. There are breaks and open glades between the rows of tree ferns and the ilex forests, which are a red gold with flowers of various *compositæ*, or, in the shadier parts, magenta-coloured with the innumerable balsam blossoms. Then one has done with the lower slopes, and is face to face with an abrupt rocky wall, the ascent of which is quite a difficult bit of Alpine climbing, rendered the more difficult, perhaps, by the abstraction of mind caused by the desire to contemplate to the full the blue masses of lobelia and the red wax flowers of the aloes which grow out of the crevices of the rocks. One last frantic scramble, holding on by roots of grass, lands one on the top of a ledge, and then comes the great surprise. One has reached a new country, a "Jack-in-the-Beanstalk" land. Far away stretch rolling grassy plains seamed with the courses of streamlets and diversified by handsome clumps of forest—forest of the temperate regions, with the branches of its trees hung with frosty-looking lichen. This is the upper plateau of Mlanje, a little world in itself, with the exhilarating climate of Northern Europe. These plains and valleys are gay with blue ground-orchids, with a purple iris,

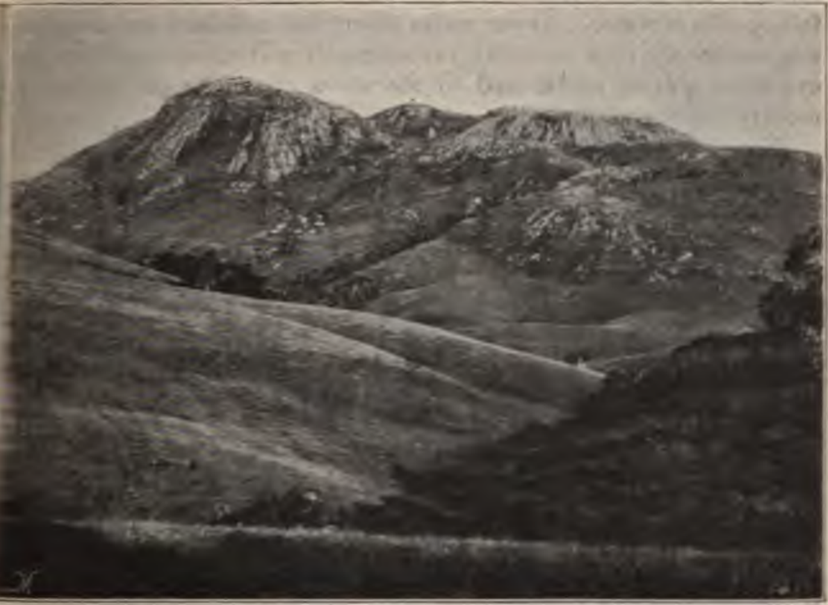

FIG. 6.—ZOMBA PEAK, MOUNT MLANJE.

and with yellow everlasting flowers. Here and there great rocky boulders stand up in stern relief against the velvet turf, and out of these elevated plains again rise other mountains, gloomy in aspect and remarkably grand in outline. The forests, on closer inspection, turn out to be mainly composed of the *Widdringtonia Whytei*, the handsome conifer to which I have already made allusion. The only other species of Widdringtonia occurs in some ranges of mountains in the southern part of Cape Colony. I believe the closest relations of this conifer are with the cypresses, but in appearance it is something between a cedar and a Scotch pine.

Here and there on the upper plateau are the most beautiful little tarns, or mountain lakes, while the air is musical with cascades and falling rills of water. As one walks about this tableland and occasionally reaches the edge an awful, yawning gulf will reveal itself, and the eye, after getting accustomed to the abyss, can make out the whole country below spread out like a faint map.

No one has succeeded in reaching the highest summit of Mlanje.[*] I have been up myself about as far as 9300 feet, and have estimated that there were fully 700 feet more of ascent before me, and I therefore approximately fix the highest point at 10,000 feet. The ascent of this high peak is rendered very difficult by the enormous size of the boulders with which it is strewn. It would seem as though the high peaks of Mlanje constitute ancient craters, from which boulders of all sizes were occasionally ejected and strewn, not only over the surrounding plateau, but over the plain below. The upper plateau of Mlanje is probably part of the ancient plateau, which has been in all directions eroded by the course of rivers. From this tableland must have arisen those volcanoes which to-day constitute the high peaks of Mlanje. The whole mountain mass of Mlanje probably occupies, with its outlying peaks connected by saddles, an area of 1600 square miles, of which 200 square miles consist of these level or gently undulating plateaux, admirably suited for European settlements. Many of the salient features of Mlanje are repeated in the striking mountains of Nyasaland, with the exception of the cedars, which, however, are reported to exist on one or two of the highest peaks of Zomba, but have never been seen elsewhere.

Now, as a contrast, let us in imagination walk over one of the great plains such as border the river Shire along portions of its course, or lie around the salt lake Chilwa, or on the western shores of Lake Nyasa. By the water's edge or at intervals over the plain are dotted groups of acacias and fan palms. The acacia has a smooth, whitish-green bark and a grass-green, close-cropped foliage, interspersed with huge white thorns; its flowers are little puff-balls of golden yellow, and xhale one of the strongest, sweetest, and most penetrating of flower cents. The fan palm is either a species of borassus or of hyphœne. The trunk is grey, smooth, and column-like; the fronds are often shaped ith a slight whorl or twist, and are a cool, blue, glaucous green. The ruit of the hyphœne is a golden brown, and about the size of a closed st. The borassus nuts are a dark brownish green, and as large as a hild's head. The outer covering of the hyphœne fruit has a faint, weet taste, something like gingerbread. It is much sought after by ephants, who, to obtain it, will drag down palm after palm.

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[*] See *Geographical Journal*, February, 1895, p. 169, for account of an ascent since this was written.

The rest of the plain is high grass—in the summer-time like a waving een sea, with the white plumes of the reeds seeming to be flecks of am. At this season these plains are almost impassable, except along he beaten tracks; but for seven months in the year the grass is either urnt down and reduced to blackened stumps by the bush fires or dries up into a golden straw, which permits of freer movements. Among these great tufts of yellow grass the tawny lions lurk, and when one is crossing these plains in pursuit of game, it is by no means an uncommon incident for a rush and a scurry to take place in the dry herbage, and for one or several lions to reveal themselves to the startled sportsman.

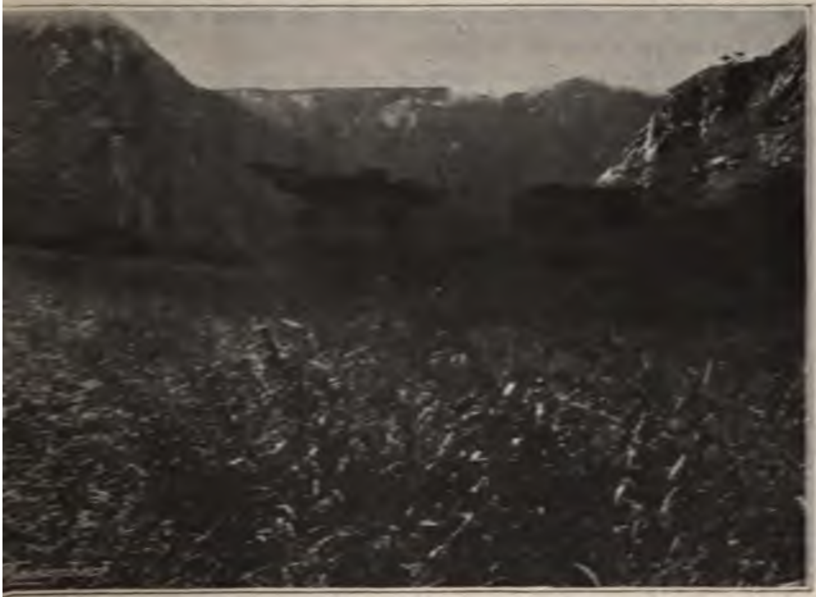

FIG. 7.—GORGE IN MOUNT MLANJE.

Under the sparse shade of the acacias or the palms, the black buffaloes will stand chewing the cud and whisking off the flies with their tails. They have usually favourite resting-places near some mud-hole, where the herbage will be trampled flat, and the ground become like a farmyard. Zebras, hartebeests, water-buck, pallah, roan antelopes, and reed-buck may be found in numbers, and often dwelling gregariously together on these hot plains; and a few vultures, eagles, kites, and Marabou storks wheel and float overhead in the dazzling bluish-white sky, on the look-out for offal. The sable antelope, the eland, the kudu, and the bush-buck seem to prefer the sparsely forested hill slopes to the flat plain, where there is usually much less cover. The rhinoceros still ranges over these plains, and wallows in the stagnant pools of the half-dried rivers.

The heat prevailing on the plains in the summer-time is very great—almost overpowering, but in the winter and spring the air is exhilarating, and in the latter season the thick, rich scent of the acacia is a joy to the senses not to be forgotten.

In spite of their supposed unhealthiness, I am always fascinated by marshes, and nowhere more so than in these parts of Africa where stagnant water is covered with blue water-lilies, and diversified with clumps of apple-green papyrus; where the reed islands are bordered and the narrow inlets blocked by the *Pistia stratiotes*, a huge duckweed of the most vivid lettuce-green, and very like a compact lettuce in shape. The intense verdure of this surface vegetation is thrown up by the occasional gaps of dark still water. There is a pretty little bird—the jaçana, chocolate, cream-coloured, and brownish green—with enormous feet, which runs over the floating lilies and duckweed in search of insects. Large verditer-blue coots,* with red legs and feet, diligently fish from the edge of the bank, while enormous storks wade with long strides in the more open spaces of water. These storks are very striking as seen from a distance, for they are a dark black-green and snowy white in colour, and their huge beaks are crimson with a black bar. The pure white egret, the cream-coloured squacco heron, the slate-coloured heron, the hugo russet giant heron, the dark brown *Scopus umbretta* also frequent these marshes; while innumerable tree-ducks, African teal, Egyptian geese and spurwing geese resort to these impenetrable swamps to lay their eggs and rear their young. If the swamp is connected with a river or lake, then you must walk warily, or you may trip over a huge sleeping crocodile, which has clambered up into the grass to sun itself. Here, too, are found the extraordinary African mudfish, a living link between the fish and the amphibian. In short, an ardent naturalist would be so fascinated by the fauna and flora of a thorough-going swamp in Central Africa, that he would have no time to feel ill from the malaria which it is supposed to cause.

It is an abrupt change from such a scene as this, recalling as it does earlier ages in the world's history before the advent of man, to pass into

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* Porphyrio.

e of our European settlements. Here will be seen clean broad level
ads, bordered by handsome avenues of trees, and comely red brick
uses with rose-covered verandahs peeping out behind clumps of
namental shrubs. The natives who pass along are clothed in white
lico, with some gaudy touch of colour superadded. A bell is ringing
call the children to the mission school. A planter gallops past on
rseback, or a missionary trots in on a fat white donkey from a visit
an outlying station. Long rows of native carriers pass in Indian
e, carrying loads of European goods, or a smart-looking policeman, in
ack fez, black jacket, and breeches, marches off on some errand. You
ill see a post-office, a court of justice, and possibly a prison, the

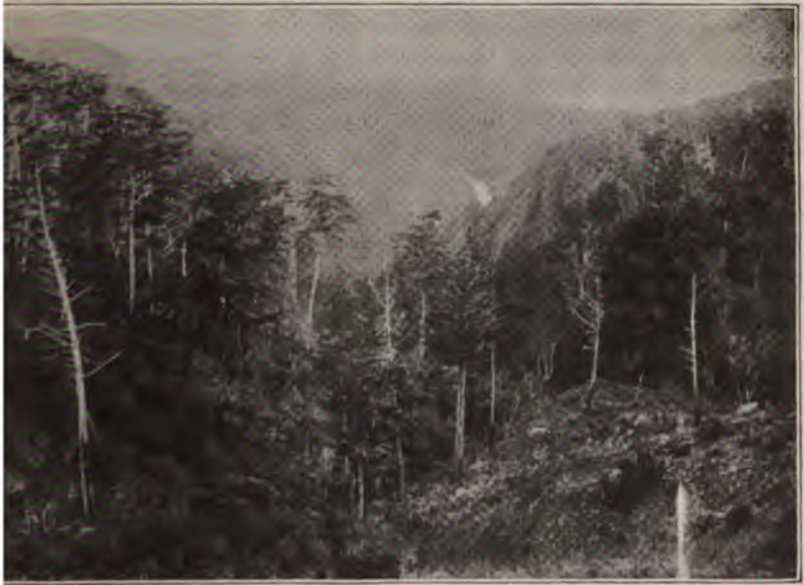

FIG. 8.—PINE FORESTS ON MOUNT MLANJE.

ccupants of which, however, will be out mending the roads under the
perintendence of some very business-like policeman of their own
lour. The most interesting feature in the neighbourhood of these
ttlements at the present time is the coffee-plantation, which, to a
eat extent, is the cause and support of our prosperity. The coffee-
rub, as you know, is a native of Africa, but, curiously enough, is not
und wild in Nyasaland, though it is met with in the wild state in the
vince of Moçambique, in many parts of West Africa, and in
yssinia. The variety which is cultivated in the Shire highlands
s actually introduced from Scotland, having been derived from a
all plant sent from Edinburgh Botanical Gardens to Blantyre about
teen years ago. From this plant, I believe I am right in saying

that the greater part of the five million coffee-trees now growing i this part of Africa are descended, while the original mother tree is stil alive in the mission grounds at Blantyre. The climate and soil o Nyasaland would seem to suit the coffee-tree to perfection, and the crop given are unusually large. The picture which I now exhibit to you i the photograph of a tree only three years old in the plantations o Mr. Sharrer, near Blantyre. As yet we have been free from the coffe disease, which, as in Brazil and India, does not appear to be able t penetrate far inland from the coast, though it has already committed ravages in German East Africa and in Natal.

One strong inducement to plant coffee in British Central Africa lie in the abundance and cheapness of the native labour, and this again i quite a recent advantage, and it is entirely due to the establishment o a strong government and the suppression of the slave-trade. When I returned to this country in 1891, the few planters then working there were already considering the necessity of importing coolie labour from India owing to the lack of local workers, for in those days many of the natives, though desirous of coming to work with the European fo money, were afraid to proceed far from their homes, in case they should be kidnapped; or, again, were afraid of attracting the attention o oppressive chiefs by accumulating wealth. Such few labourers as could be obtained from the west coast of Lake Nyasa had to be brought down in driblets by the Lakes Company's steamers, because they were afraid to walk overland. The suppression of the slave-trade and the forcible measures taken to restrain the Yao chiefs from making slave-raids, have enabled us to turn to advantage an enormous supply of free labour. Natives will now travel on foot several hundred miles to obtain work in the European plantations, with the certitude that they will be well treated, well paid, and able to return in safety to their homes with the wages they have earned. The increase of the native population of this Protectorate is remarkable. In the Lower Shire district the inhabitants, when numbered by me in 1891, scarcely attained a total of 1000; they now number 10,000, and the hut taxes that they pay exceed £400 a year. In the Blantyre district the native population is almost doubled by immigration and natural increase. In the South Nyasa district, it is estimated that there are ten large villages now existing on the west shore of Lake Pamalombe, where in 1891 there was not a single human inhabitant owing to the ravages of the slave-raiders. With the gradual substitution of monogamy for polygamy, as the teaching of the missionaries bears fruit, with the remarkably fertile soil and the cessation of the slave-trade, it is probable that before long the Protectorate of British Central Africa will become one of the most densely peopled portions of that continent: and this in itself is a source of wealth, because, if we can only induce the black man to till the soil to labour under the hot sun which debars the European from sever physical exertion, we shall be able to produce in enormous quantities all the most valuable crops of the temperate and tropical regions.

It would be unfair to leave you, at the close of this address, with the impression that all this present prosperity is solely due to the exertions of the present settlers in British Central Africa, and as the result of the establishment of a firm government. We must never forget that it is based first of all on the work of Livingstone, Kirk, and Elton. Among other of the earlier pioneers also should not be forgotten the name of Herbert Rhodes, the brother of the distinguished South African statesman, who died from an accident on the Upper Shire after exploring what is the modern Protectorate from end to end. Captain Foot, the first consul, died before he could carry out the schemes he had in hand; but his successor, Lieutenant Hawes, now Commissioner and Consul-General in Hawaii, was one of the ablest men who have entered Nyasaland, and the work he did was good and lasting. Mr. O'Neill, the former consul at Mozambique, laid the foundations of a systematic survey, and

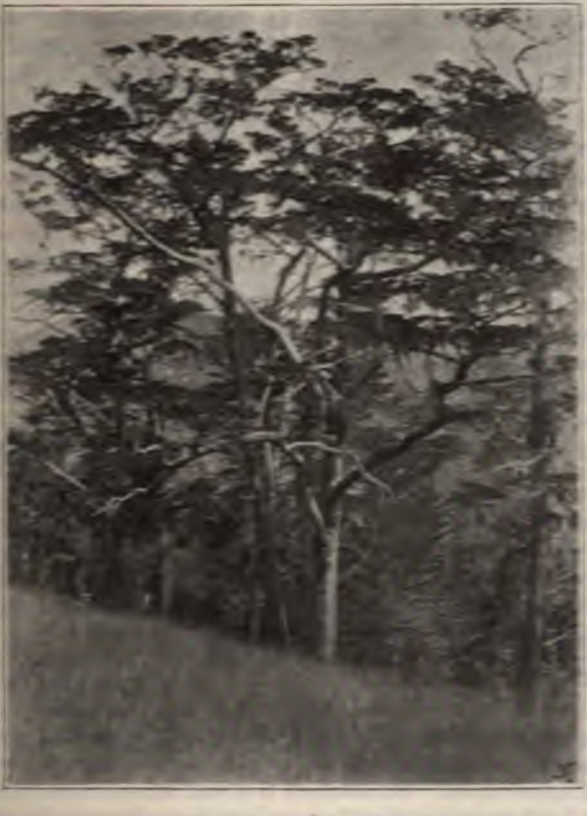

FIG. 9.—WIDDRINGTONIA WHYTEI.

obtained the gold medal of this Society for that and other geographical work; and mention should also be made of Mr. J. T. Last, whose surveys are being incorporated in the new map which is being drawn by Captain Sclater. There is one more recent explorer whose work in connection with Nyasaland should certainly not be overlooked, because it has not only added greatly to our geographical knowledge, but the immediate results of the fatigues and sufferings endured on a long journey to Bangweolo have caused serious injury to his health. I allude to Mr. Joseph Thomson, who in British Central Africa, as in Masailand and in the Niger basin, has assisted to lay the foundations of the three great chartered companies. The very serious break-down of Mr. Thomson's health has obliged him to submit to a temporary exile in Italy, where I am sure he will be followed by the sincere sympathy of this Society. Lastly, I wish to draw your attention to the name of Captain Cecil Maguire, lost all too soon at the outset of a brilliant career. Captain Maguire, though but a young man, had already attracted marked attention in India, where, prior to his embarkation to Africa, he occupied a staff appointment as secretary of the Mobilization Committee in India; but he was otherwise and specially distinguished for his remarkable knowledge of languages and his skill in athletic sports. I will not try your patience by enumerating all his accomplishments, but I would sum up his character by saying that he was almost too good a man to be thrown away on Africa in its present undeveloped condition. And to a certain extent he *was* thrown away, though the country still talks of his deeds, and though he broke the back of the slave-trade in Southern Nyasaland. But he died in a way and at a time which failed to attract public notice or sympathy. It is bad enough to die, but to die nobly and in a good cause and to be forgotten, is a refinement of cruelty on the part of Fate. Therefore it is that I am resolved that, so long as I have a voice and am heard in connection with Central Africa, the name of Cecil Maguire shall always be remembered.

Before the reading of the paper the President said: In her Majesty's Commissioner for the British Central African Protectorate, we have once more amongst us a very old and valued friend. Mr. Johnston is so well known to the Fellows of this Society that I feel any introduction from me is quite unnecessary, therefore without further preface I will request Mr. Johnston to read to us the paper of the evening.

After the reading of the paper, the following discussion took place:—

The PRESIDENT: In Mr. Johnston's most interesting paper, to which we have all listened with feelings of admiration, he has explained to us how the dream in which geographers indulged for nearly forty years has at last been realized by him. I well remember at the Livingstone festival, now thirty-six years ago, how that great man explained to us that, when he left England in 1858, his hope and aspiration was to find, by the Zambezi route, a pass to those highlands which our friend is now administering with such marked ability and success. The most distinguished of the companions of Livingstone on the great occasion when he discovered the Shire river and Lake Nyasa is with us this evening. I will therefore request

Sir John Kirk to open the discussion with some remarks upon Mr. Johnston's paper.

Sir JOHN KIRK: After hearing the interesting account given by her Majesty's Commissioner of the steady advance that has been made in Nyasaland, we must look back upon the time when the three expeditions went out which ended in the discovery of the three great African lakes, one of which flows by the Nile to the Mediterranean, another by the Congo to the Atlantic, and the last of all, the smallest, although 300 miles in length, leads by the Zambezi to the Indian Ocean. The discovery of these three great lakes is entirely due to the initiative of this Society: two of the expeditions referred to were paid for directly by this Society; the other, at the instigation of Sir Roderick Murchison, our President, was sent out by her Majesty's Government, and it was to that one I had the honour to belong.

Great difficulties have been overcome in Nyasaland by the missionaries, who steadily worked at Zanzibar, to which place the first mission was temporarily withdrawn after the death of Bishop Mackenzie. Others in the interior reduced the grammar of the languages and supplied text-books, which now enable those going out to acquire an accurate knowledge at once, without the labour of picking it up as the earlier missionaries and planters had to do after getting into the country. The next great difficulty to be overcome was that of transit. The river and the coast were then in the hands of the Portuguese, who commanded the mouth of the Zambezi, where they not only levied high duties, but imposed vexatious rules; but her Majesty's Government has since obtained the opening up of that river to free navigation of all nations, so goods pass free without paying duty at the coast through to British Nyasaland. On the other hand, the British protection of Nyasaland possesses great advantages, such as free labour, and a docile people, who, in the hands of the Zanzibar Arabs, have supplied the porters who have followed all those explorers who have done good work of late in the country. It was through these Nyasa and Yao people that Burton, Speke, and Grant were able to make their discoveries; they afterwards supplied the staff of Cameron and Stanley. This shows the value these men are now likely to be to us in the British Protectorate. Another great advantage which Nyasaland possesses is in being the natural high-road of trade into the interior. Hitherto the trade of the west of the Congo State has passed through the German East African ports, where duties are put upon goods imported of upwards of ten per cent., and fifteen per cent. on ivory coming out. These duties are in addition to any that may be collected by the Congo State, and will now not be paid, because the road through Zambezia allows the ivory and produce to pass down free of all duty to the Indian Ocean, whence they can be exported; so also with imports, which pass free in transit. This must secure to Nyasaland the carrying trade of the interior west of the Congo State; nor will the Congo State look upon this as a disadvantage, for duties will be paid to that State alone on the arrival of goods at the frontier, and on produce before it passes out. Further, Nyasaland possesses a healthy climate and a rich soil. Mr. Johnston mentioned an interesting fact that the wheat received and grown by the French missionaries on Tanganyika had succeeded better in Nyasaland than the Indian and European wheat. Now, this is but natural, for the wheat referred to was not taken there by the French missionaries; it has been cultivated in Central Africa for forty years by the Arabs. Captain Burton mentions that at Unyanyembe, on his first arrival in 1857, he was supplied with wheat grown by the Arabs. It was originally obtained by them from Muscat, and that is, no doubt, the origin of the seed-wheat now grown at Blantyre successfully. There is one other point Mr. Johnston mentions regarding the discovery of cypress trees in Mount Mlanje. I think he rather overestimates the scientific importance of this discovery, not commercially, but scientifically. The conifers here found are better represented further north near the equator, not by stunted bushes as stated by Mr. Johnston, but by large trees that Captain Lugard describes as upwards of 100 feet high, with a bole 5 feet in diameter, and straight for 50 feet like a ship's mast. These occur in Laikipia in British East Africa, where we find the juniper from Abyssinia, a large tree over 100 feet high, with wood very much like cedar, growing alongside of the Podocarpus, a conifer of the Cape. It is not on the Mlanje mountains, but further north, that the mixing of the two floras occurs in Eastern Africa, in the district between Kenya and Kilimanjaro; there we find distinct types from the Cape mixing with others from Abyssinia. At this late hour I will not detain you with any further remarks, but congratulate Mr. Johnston in being able to give so satisfactory an account of his administration of the country.

Mr. Whyte: With reference to the Widdringtonia found on the Mlanje mountains, I may say it is a tree which very much resembles the Scotch fir; it grows very tall—about 150 feet high—with a stem of a diameter of 6 feet at the ground. It has proved to be very good workable timber, and our Commissioner had quantities of tables, chairs, and other furniture made from the wood at the Residency, Zomba. It also has a very pleasant scent, and while the cuttings are used as firewood in the grate, the odour in the room is very pleasant. It resembles in colour a good deal the pencil cedar, although not quite so dark, but with very much the same grain, and equally easily worked. I may also mention I discovered another conifer in Mount Mlanje of a smaller and trailing habit. I did not succeed in procuring the seed-vessels or cones of that species, but hope to do so soon; it is similar to the *Widdringtonia Whytei*, but more delicate. The wood of it is of comparative little value, as it grows to no great size. In exploring the upper plateau of Mount Mlanje, which Mr. Johnston has so well described to you, I found the flora to be of a most interesting character, and the collections sent home were found to contain a large percentage of genera and species new to science. Unfortunately, it is only during the dry season of the year that much exploring can be done in the mountains, on account of the extreme moisture and high grass in the rainy season. When I return again and my health permits, I shall try to do as much more collecting as I can, and, I hope, with good results.

Rev. Horace Waller: I can only add more congratulations to those which have been offered to Mr. Johnston, who is able to-night, in the presence of some of his staff, to recount to us the wonderful way in which Livingstone's predictions and hopes have all been fulfilled. Of course, recollecting our objects in going into that country, one puts in the foremost place the reduction of that terrible slave-trade which hitherto has been the bane of the whole of that land. One observation of Mr. Johnston's certainly made me take heart of grace. When I was in the Nyasaland myself, some thirty years ago, and we had occasion to try and stay in a small degree the ravages of the Yaos, I always gave and stuck to the opinion that, as British power solidified, so it would be a very easy thing to get from the ranks of the Yaos and A-nyanja a sufficient force to protect their own country. If the Arabs were to beat us to-morrow, they would go to the Arabs; they turn to the rising sun, but they are now quite 'cute enough to see that progress is on the side of the British, and I am sure this will continue. They are only waiting for the 'steel head to the lance.' Troops can be raised in the country for its development. There is another thing to be done by the British Government; it can gather courage from what has taken place in this Protectorate. Mr. Johnston has shown us that abundant free labour is to be had by kindly treatment and the offer of protection to the labourer. I do hope, before many months are over, that the imploring voice of those who have spoken to her Majesty's ministers on this subject will gain its proper hearing, so that Arabs who go into Africa from the Zanzibar Protectorate, and the natives who go to and fro between Zanzibar and the interior, will soon be able to say that the English are now dead against slavery in every shape and form.

The PRESIDENT: In commencing his paper, Mr. Johnston alluded to the importance of the measures taken by this Society for the advancement of geographical knowledge, and how our strenuous efforts often led to increased political interest being taken in the countries which otherwise would be only half known or remain unknown. That is no doubt true. It is, however, to those gallant explorers who have done the work of the Society in little-known regions that the success of our efforts is mainly due, and amongst the highest in merit, of those now living, certainly our friend Mr. Johnston stands in the front rank. To him, therefore, our warmest thanks are due, both for the great work he has done in Africa, and for the pleasure he has given us this evening. I see that the vote I am now proposing is carried by acclamation; but I also feel that Mr. Johnston would not forgive me if I did not include in the vote of thanks the names of his brave and able coadjutors, Mr. John Buchanan, Mr. Whyte, Mr. Sharpe, Captain Sclater, the civilizer or road-maker (for I look on the terms as synonymous), and the others. In conveying to Mr. Johnston the thanks of this great assembly for his interesting and able paper which has given us so much pleasure this evening, I am glad to couple with his name those of the coadjutors who assisted him.

Mr. JOHNSTON: You have listened with such kind and protracted attention that I will not detain you any longer, as I am afraid my paper has been rather a long one. I receive with the greatest pleasure and satisfaction your thanks, because I know, in consequence of what our President has said, they are not by any means directed wholly and solely to myself, but I can transmit them not only to my colleagues in London, but those labouring out in Central Africa. I hope before long to go back to the scenes of my three years' work, and perhaps when I once more return, I may be allowed to come before you again and give you further information.

APPENDIX.

NATURAL HISTORY OF THE BRITISH CENTRAL AFRICA PROTECTORATE.

In pursuance of arrangements effected before Mr. Johnston left England, all the specimens of natural history collected for Mr. Johnston by Mr. Alexander Whyte, F.Z.S., and his assistants were sent home to Mr. P. L. Sclater, F.R.S., Secretary to the Zoological Society of London, to be unpacked and sorted. This having been done, the contents were submitted by Mr. Sclater to various specialists for examination and report. A list of these reports is appended.

A complete set of the whole of the objects in the various collections was assigned to the British Museum (Natural History). The duplicates were presented to the Museum of Science and Art, Edinburgh, and other institutions, or disposed of in other ways.

The Mammals were examined and reported upon by Mr. Oldfield Thomas, F.Z.S., of the British Museum (Natural History).

Mr. Thomas's reports are—

1. "On Mammals from Nyasaland," *P.Z.S.*, 1892, p. 546.
2. "On a Second Collection of Mammals sent by Mr. H. H. Johnston, C.B., from Nyasaland," *P.Z.S.*, 1893, p. 500.
3. "On the Mammals of Nyasaland: third contribution," *P.Z.S.*, 1894, p. 136.

Some skins of Mammals obtained by Mr. H. H. Johnston, C.B.; Lieut. B. L. Sclater, R.E.; Messrs. Buchanan Bros.; and Mr. A. Whyte, F.Z.S., in the Shire Highlands, were also exhibited to a meeting of the Zoological Society of London, and reported upon by Mr. Sclater (see *P.Z.S.*, 1893, p. 506).

The Birds were examined and reported upon by Captain G. E. Shelley, F.Z.S. His reports are—

1. "List of Birds collected by Mr. Alexander Whyte, F.Z.S., in Nyasaland," with a preface by P. L. Sclater, Ibis, 1893, p. 1, plates i.–iii.

2. "Second List of Birds collected by Mr. Alexander Whyte, F.Z.S., in Nyasaland," Ibis, 1894, p. 1, plates i., ii.

3. "Third List of Birds collected by Mr. Alexander Whyte, F.Z.S., in Nyasaland," Ibis, 1894, p. 461, plate xii.

The Reptiles, Batrachians, and Fishes were examined and reported upon by Dr. A. Günther, F.R.S., of the British Museum (Natural History). Dr. Günther's reports are—

1. "Report on a Collection of Reptiles and Batrachians transmitted by Mr. H. H. Johnston, C.B., from Nyasaland," *P.Z.S.*, 1892, p. 555, plates xxxiii.–xxxv.

2. "Second Report on the Reptiles, Batrachians, and Fishes transmitted by Mr. H. H. Johnston, C.B., from British Central Africa," *P.Z.S.*, 1893, p. 616, plates liii.–l[illegible]ii.

The Mollusks were examined and reported upon by Mr. Edgar A. Smith, F.Z.S., of the British Museum (Natural History). Mr. Smith's report is—

"On a Collection of Land and Freshwater Shells transmitted by Mr. H. H. Johnston, C.B., from British Central Africa," *P.Z.S.*, 1893, p. 632, plate lix.

The Insects were examined and reported upon by Mr. C. J. Gahan, M.A., and A. G. Butler, of the British Museum (Natural History). Their reports are—

1. "On a Collection of Coleoptera sent by Mr. H. H. Johnston, C.B., from British Central Africa," by C. J. Gahan, M.A., *P.Z.S.*, 1893, p. 739.

2. "On Two Collections of Lepidoptera sent by H. H. Johnston, Esq., C.B., from British Central Africa," by Arthur G. Butler, PH.D., F.L.S., F.Z.S., *P.Z.S.*, 1893, p. 643, plate lx.

The Plants were submitted to the Botanical Department of the British Museum. The report on them, drawn up by the officers of that department, has been published by the Linnæan Society. It is entitled as follows:—

"The Plants of Mlanji, Nyasaland, collected by Mr. Alexander Whyte, F.Z.S., and described by Messrs. Britten, E. G. Baker, Rendle, Gepp, and others," with an Introduction by William Carruthers, F.R.S., F.L.S., *Trans. Linn. Soc.*, Lond., ser. 2 (Botany), vol. iv. p. 1, plates i.–x. and map (1894).

SOME SHORT NOTES ON THE GEOLOGY OF MLANJE.

The greater portion of the mountain mass is gneiss varying much in colour, texture, composition, and hardness, and in some places, especially to the south-west, it is overlaid by a coarse laterite (which is supposed to be a derivative from the gneiss), and an iron conglomerate held together by ferruginous matter. The gneiss, as far as I saw, does not approach syenite in colour so much as it does in the region of the cataracts, where it almost approaches the colour of Peterhead granite.

The action of the water in many places, especially the portion under the peak, on the left bank of the Lichenya stream, has decomposed the felspar, and that part of the mountain shows many indentations in consequence.

Unlike other countries where gneiss predominates, limestone does not appear to exist (or, I should rather say, has not yet been lighted upon), and the soil at the base of the mountain gives evidence of its absence.

On the south-west slope and base of the mountain, and continuing to the north-west, unstratified basaltic rock is very prominent, especially where the Lichenya stream has scoured away the mass of *débris* which at one time covered it. In several of the beds of the streams, if the basalt were cut down perpendicularly, one might expect to see a form of structure almost approaching the columnar.

On the edge of the plateau at the most southern corner there are two small craters about 60 feet deep, and below, some 3000 feet, are the traces of a comparatively late eruption. Large pieces of lava, and in places scoriæ, are to be seen in the beds of the streams immediately beneath the two craters.

Outside the visible line of the basalt hematite iron occurs in a series of low flanking hills, and is of very pure quality, the natives simply smelting and hammering it between two stones preparatory to forming it into garden hoes, knives, etc.

The valley of the Tuchilla is the only part of the mountain that I am acquainted with which I could reconcile the glacial action to having taken place. The bed of the stream (which is here at its best only a mountain torrent) is polished smoothly to a much greater width than ever the water-action could have spread to. At many points are to be seen "perched" blocks, and at the foot of the valley is an unmistakable moraine, which the stream has cut a way round to the eastward. On digging in this low hill, I found it to consist mostly of detritus and flat polished stones. I cannot, however, say that I noticed any signs of striation in the bed or along the sides.

T. H. LLOYD.

BLANTYRE,
September 29, 1894.

NOTE ON MAP TO ACCOMPANY MR. H. H. JOHNSTON'S PAPER.*

This map is based on the following astronomical points taken by Mr. Sharpe and former travellers:—

	Lat. S.	Authority.	Long. E.	Authority.
	° ′ ″		° ′ ″	
Blantyre	15 47 10	O'Neill Sharpe	35 3 54	O'Neill
Zomba	15 22 40	Last (Mean of 16 obs. Last, Sharpe 1 ob.)	35 17 45	Sharpe
Chipoka's	16 2 30	O'Neill	35 39 57	O'Neill
Chikwawa	16 1 56	Sharpe	34 53 20	Sharpe
Chiromo	16 30 57	Keane	35 9 41	Keane
Dikiri	15 40 59	Sharpe	34 40 6	Sharpe
Matope	15 22 15	Stewart	34 56 9	Stewart
Mpimbi	15 15 37	Sharpe	35 2 20	Sharpe
Fort Johnston	14 26 34	Sharpe	35 10 0	Last
Livingstonia	14 2 37	Last	34 47 10	Last
Kalawili's	13 22 0	Sharpe	34 44 0	Sharpe and O'Neill, corrected as under
Bandawi	11 55 0	Mean of Sharpe, O'Neill, and Stewart	34 8 22	"
Karonga	9 56 20	Sharpe MacEwan	33 54 0	"

The following new latitudes by Mr. Sharpe have also been used: Liwondi, 15° 0′ 30″; Zoa, 16° 18′ 22″; Mkanda, 15° 53′ 44″; Fort Lister, 15° 48′ 52″; Pamalombi Crossing, 15° 30′ 51″; Nyaserera's Town, 15° 41′ 40″; Mvera, 14° 47′ 39″; Makanjira, 13° 40′ 28″; Ruawe, 11° 6′ 37″.

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* By Lieutenant B. L. Sclater, R.E.

The Shire river below Chiromo is taken from the Admiralty chart by Captain Keane, R.N.; from Chiromo to Chikwawa, from a sketch by Mr. H. H. Johnston, C.B.; from Chikwawa to Matope, from a survey by Mr. Lloyd, Surveyor, B.C.A.A.; from Matope to Fort Johnston, from a sketch by Mr. Johnston. Two routes of Mr. Johnston are used—from Matope to Blantyre, and from Mpimbi to Zomba. Mr. Last's routes from Blantyre to the north of Mlanje and round the east of Lakes Shirwa and Chiuta are used; the remainder of the detail in the Shire highlands is worked in from a compass sketch by Mr. B. L. Sclater. On the west of the Shire, the Lower Shire province is from a sketch by the late Mr. Peel, of the Administration; the telegraph-line, from a route by Mr. Bowhill; the Mwansa river, by Mr. B. L. Sclater. The Portuguese territory to the west is taken from a map by M. Foa, of the Central African Company; Mr. Scott Kerr's route being worked in from Tete to Lake Nyasa, and also Mr. Sharpe's route from Matope to Undi. Mr. Last's route and observations from Mpimbi to Livingstonia and Mponda, are laid down as given by him. The detail of the west shore of Lake Nyasa is laid down as given by the late Mr. Stewart, C.E., based upon the astronomical positions given above. The country to the west of the southern half of the lake is taken from Mr. Joseph Thompson's map as compiled by Mr. Ravenstein; Mr. Sharpe's route from Kazembi's to Mpeseni's is worked in; to the west of the northern half of the lake, Mr. MacEwan's route as given by Mr. Ravenstein in the *Scottish Geographical Magazine*. To the north of the lake the detail is taken from a sketch by Dr. Merensky. The east of the lake as far south as lat. 11° is taken from Mr. Ramsay's map published in the *Mitt. Deutsches Schutzgebieten*. The rest of the east coast is taken from Mr. Stewart's map published in *Proceedings* R.G.S., 1880, from the work of Messrs. Laws and Cotterel; and the interior to the east of the southern portion of the lake, from Mr. Last's map in the *Proceedings* R.G.S., 1890.

EXPLANATION REGARDING NEW LONGITUDES.

Mr. Sharpe's longitudes on the lake are all referred to Fort Johnston, as he has not sent home ratings of his watch after his return to Blantyre. The longitude of Fort Johnston is fixed by Last's observation of Mponda. Sharpe makes it 6 miles to the east of Last, but as Last's position agrees with bearings of Mount Zomba and other points taken by Mr. Johnston, his longitude has been taken. By deducting 4′ from O'Neill's positions for the lake, it makes them agree almost exactly with Last's position for Livingstonia, and also with Sharpe's position for Bandawi and Karonga, based on Last's position for Fort Johnston, as under:—

		°	′	″	
Mponda,	Last	35	8	39	
Fort Johnston,	1½ miles east	35	10	0	Difference 6′
	Sharpe	35	16	0	
Livingstonia,	Last	34	47	10	Difference 4′ 3″
	O'Neill	34	51	13	
Bandawi,	Sharpe	34	14	30	Difference 6′
		34	8	30	
	O'Neill	34	12	18	Difference 4′ 3″
		34	8	15	
	Take	34	8	22	Mean of corrected longitude
Karonga,	Sharpe	33	59	30	Difference 6′
		33	53	30	
	O'Neill	33	58	25	Difference 4′ 3″
		33	54	22	
	Take	33	54	0	Mean of corrected longitude

A PRE-COLUMBAN DISCOVERY OF AMERICA.*

By H. YULE OLDHAM, M.A.

It is unnecessary to point out to an audience of geographers the vital importance of the discovery of America, especially in its effect on our own islands. An apology is perhaps needed for venturing to say anything fresh on a subject which has so often and so ably been discussed.

To find anything new in a mine as energetically searched as this has been, might seem impossible; to assert that there was an entirely new vein to work at would seem, I fear, presumptuous. And yet a different angle of vision frequently shows surprising effects. It was long before the discovery was made that by the mere action of a prism a ray of apparently colourless light could be resolved into the varied hues of the rainbow; and there are still to be found in the East mirrors of metal, which, though seemingly plain and valueless, yet, when held in particular wise, reveal astonishing designs.

To be explicit at the outset, the object of this paper is to bring forward evidence in favour of a discovery of America by the Portuguese some forty-five years before the date of the famous first voyage of Columbus. While claims to the honour of the discovery of America have been made on behalf of representatives of many countries, ranging from China down to Wales, it is strange that none should have been urged in favour of the Portuguese; and yet there is a strong inherent probability that, in the course of their exploration of the West African coast, they must have reached the New World.

To use a knowledge of present conditions in speculating on past probabilities is never unprofitable.

Let a map of the Atlantic, as we now know it, be examined, and it at once becomes evident that there are three points in the New World which are especially accessible from the old. They are (1) *Canada*, by the easy stepping-stones of Iceland and Greenland; (2) *The West Indies*, with the aid of the steady north-east trade winds; (3) *Brazil*, which is not only the nearest point, but has the additional advantages of winds and currents tending in its direction.

It was by the *first* of these that the Norsemen reached America at the end of the tenth century.

The *second*, which was utilized by Columbus towards the close of the fifteenth, seems—to judge from tradition and the records of contemporary maps, showing large land-masses as far west of the Azores as they are west of Europe—to have served others in the early part of the same century. The evidence for this is chiefly in connection with the island named Antilia. This island, which first appeared as a somewhat rectangular parallelogram on maps early in the fifteenth century, and on one by Beccario dated A.D. 1435,* in conjunction with others, is labelled

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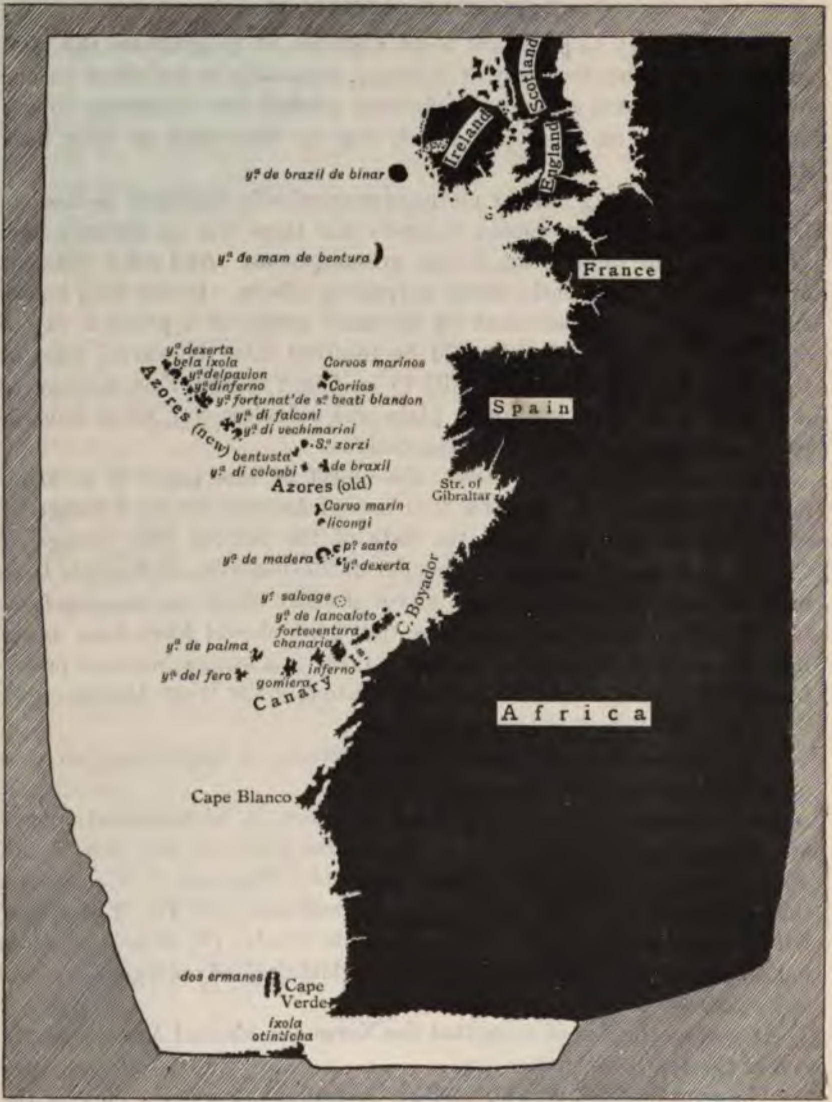
* Report of paper and discussion at the Royal Geographical Society, Technical Meeting, November, 1894.



Walker & Boutall sc.

FIG. 1.—SKETCH OF MAP BY ANDREA BIANCO, A.D. 1448.

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* A reproduction of this map is given in the first edition (1875) of 'Studi biografici e bibliografici,' by Uzielli and Amat di S. Filippo. Humboldt mentions an earlier map at Weimar, to which he gives alternately the dates 1424 and 1425, on which Antillia is shown, but it has not been reproduced.

"Islands newly discovered," became subsequently identified with an old Portuguese tradition of an unknown land in the West, where seven cities were founded in the eighth century by an archbishop and six bishops, who had fled from Europe before the invading Moors. In this form, as the island of seven cities, Antilia kept its place on maps throughout the fifteenth century, until its name and identity became merged in the Antilles.

But that, though interesting, is another matter. It is to the *third* route, from Africa to Brazil, that I wish to draw particular attention.

This, though the shortest and easiest, was practically not available until the West African coast had been explored as far as Cape Verde, and that was not done till near the middle of the fifteenth century, the credit of the achievement being due to the Portuguese, and especially to that most remarkable man Prince Henry the Navigator, the fifth centenary of whose birth was celebrated this spring.

It was in or about the year 1443 that, after a quarter of a century spent in unwearied efforts along the inhospitable edge of the Sahara, inhabited regions were reached to the south of that desert. Two years later, in 1445, Cape Verde was for the first time rounded.

In the following year the Gambia was reached, and thus within the space of only three years the whole of the rich coast of what we now call Senegambia was laid open to Portuguese commerce.

The result was an outburst of wild enthusiasm; every one seems to have been anxious to share in the riches of the new-found lands. Thus fleets of as many as ten and fourteen ships sailed in a single year, where for twenty-five years but one or two had been with difficulty despatched by the strenuous efforts of Prince Henry.

With so sudden a development there is every probability of much inexperience on the part of some who participated, and few things are less unlikely than that one of these ships, manned by inexperienced sailors, and sailing in little-known waters, should have been driven in a storm out to sea, and ultimately carried on to the coast of Brazil.

This is no mere rash conjecture. It was thus that, but a few years later, the Venetian Cadamosto, sailing under the patronage of Prince Henry to the Gambia, was caught in a storm when trying to round Cape Verde, and driven on to the Cape Verde Islands. And it was thus that the Portuguese Cabral, when trying with a well-equipped fleet to follow the route to India round the Cape of Good Hope, opened up by Vasco da Gama, was actually carried on to this very coast of Brazil.

What happened to Cabral in 1500 may well have happened to others at an earlier date; in fact, as soon as ships began to round Cape Verde.

That cape, as has been said, was first rounded in 1445. There is strong reason to believe that within three years of that date Brazil was reached. The evidence is to be found on a remarkable manuscript map,

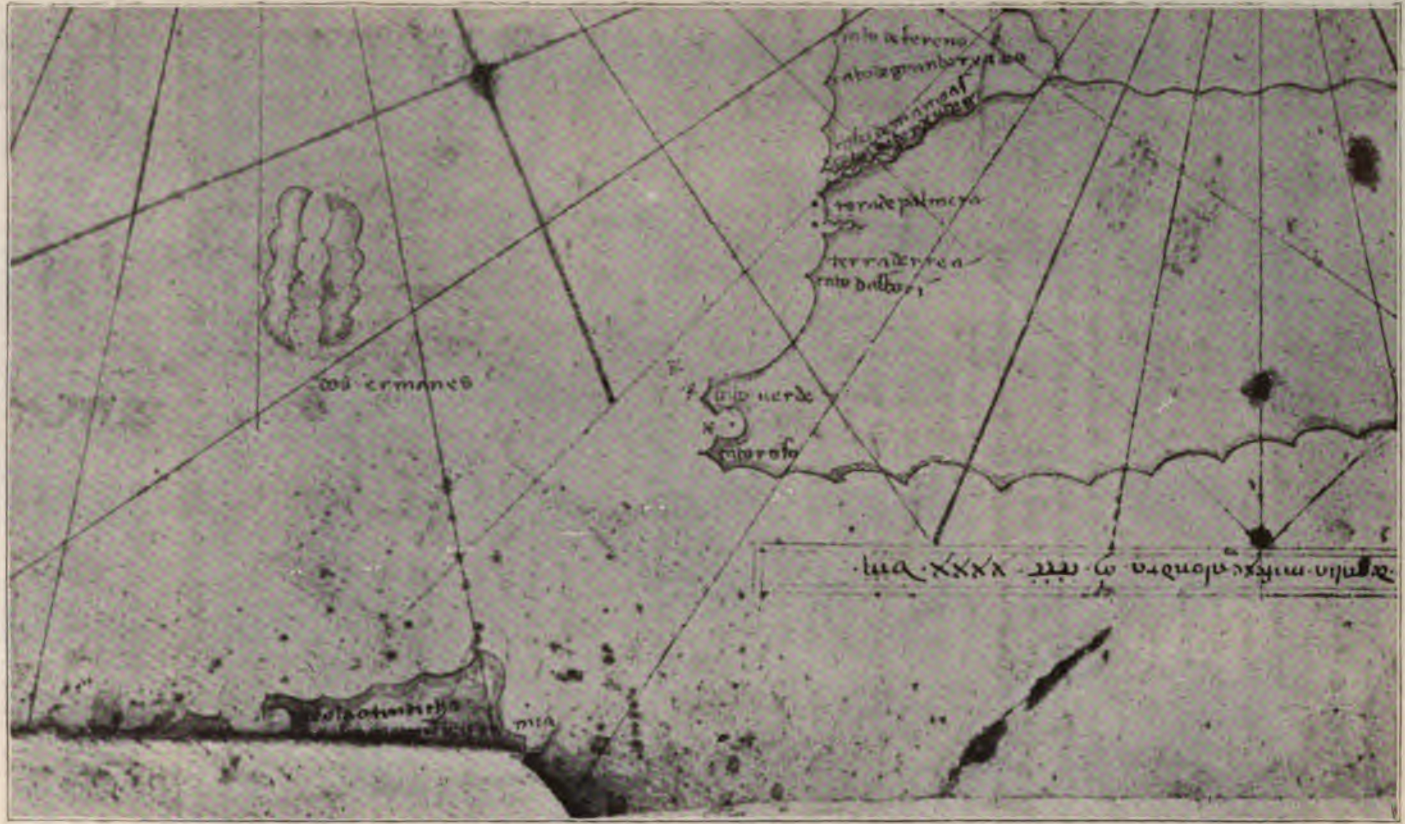

FIG. 2.—PORTION OF ANDREA BIANCO'S MAP, A.D. 1448.
(*Natural size, from Photograph specially taken by kind permission of the Curator of the Ambrosian Library.*)

now in the Ambrosian Library at Milan, but originally drawn by Andrea Bianco of Venice in the year 1448, in London.*

Without venturing on a discussion of the interest and importance of the early manuscript maps, a subject which has been far too little studied in this country, it may be noticed that they can roughly be divided into two classes—(1) planispheres, (2) portolani.

The two are, as a rule, widely different. The former, circular in shape and fanciful in conception, attempt to represent the whole of the known world by the light of monastic tradition. Jerusalem occupies the centre, Paradise graces the top, while the rest is adorned by sketches of more or less fabulous creatures.

The latter, the portolani, are to these as a scientific treatise is to a work of fiction. Made by practical men for practical purposes, by seamen for seamen, they are usually confined to the shores of the Mediterranean and adjacent seas, and are of an astonishing accuracy. It is to this class that the map in question belongs.

A single glance, however, suffices to show that in one respect it is exceptional; whereas, in almost all other maps of the same kind, the Mediterranean is the most important feature, here it is altogether absent. The map is confined to the western shores of Africa and Europe, and accordingly has the N.-S. direction along the length of the parchment on which it is drawn, and not, as was usual, across the breadth.

The draughtsman of the map, Andrea Bianco, is perhaps the best known of the rare cartographers of the earlier portion of the fifteenth century, for we possess a set of maps made by him twelve years before this 1448 map, and he is said to have assisted in the construction of Fra Mauro's great map, which was finished eleven years after that date.

A comparison of the 1448 map with the earlier one from the same hand, made, as has just been mentioned, in 1436, shows no difference with regard to the European coasts, save a slightly better acquaintance with the British Isles. It is in the African portion that the cartographer had new information to reveal. Here, for the first time on any map that is as yet known, are shown the results of the Portuguese discoveries down to Cape Verde. The then recently rediscovered Azores are also shown for the first time, in the place of the island of Antilia marked on the earlier map.

These novel features would alone serve to render this map remarkable, but it is made unique by something else, for at the lower edge of the map, south-west from Cape Verde—that is, in the direction of

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* Press mark, F. 260, Inf. It is of large size, 86 cm. × 63 cm., and coloured in the usual way. It shows several signs of having been made somewhat hastily. The signature is in its usual position across the neck end of the parchment, which is in this case to the south, and not, as commonly, to the west.

Brazil—there is to be seen a long stretch of coast-line, with this singular inscription in the Venetian dialect: "ixola otinticha," that is, *authentic* or *authenticated island.* It is difficult to believe that this can refer to anything but Brazil.

There is nothing of the conventional form or vague name, as in the case of "Antilia," but a definite attempt to show a coast-line, with the emphatic addition that it is "genuine."

Owing to lack of room on the parchment on which the map is drawn, only a corner of this island is shown, on the very edge of the skin, but still much closer to Cape Verde than Brazil actually is. As if, however, to prevent any misconception, the cartographer has added under the words "ixola otinticha," the qualifying statement, "xe longa a ponente 1500 mia." Giving "longa" its ordinary meaning, "long," this would read, "is 1500 miles long to the west," which would be somewhat pointless.* But if "longa" be taken in the sense of "distant," which in mediæval Italian it had, this very pointed meaning is obtained: *authentic island is distant* 1500 *miles to the west.*

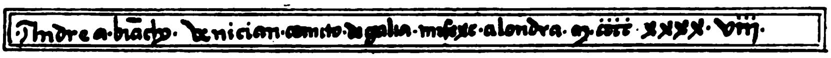

FIG. 3.—SIGNATURE OF ANDREA BIANCO'S MAP.

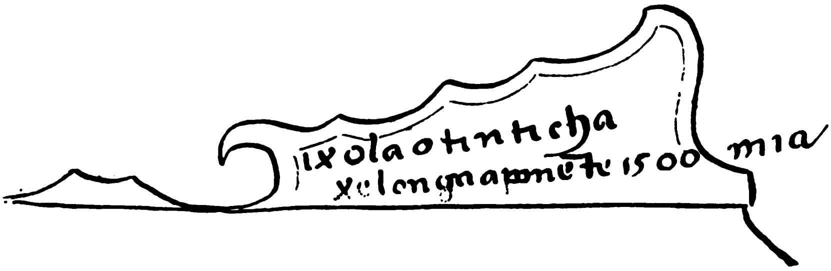

FIG. 4.—THE IXOLA OTINTICHA, TRACING FROM ENLARGED PHOTOGRAPH.

This not only explains the position given to the island on the map, but also the reason for adding a note of the kind, which on such maps is quite exceptional. It is as much as to say, "There is really some land south-west from Cape Verde, but, lest you should imagine that it is as close as lack of space compels me to draw it, I must add that it is distant 1500 miles to the west." The map in question is not altogether unknown, and is now accessible in the invaluable series of photographs of old Italian maps edited by Professor Fischer of Marburg.*

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* "Longa" is the Venetian form of "lunga." Petrocchi ('Novo Dizionario.' Milan, 1891) gives "lontano" for the meaning of "lungo" in mediæval Italian: and Tommaseo and Bellini's great dictionary has many instances of "lungo" used in this sense of "distant." There are two good reasons for not translating "longa" as "long," besides the comparative pointlessness of the legend when taken with that meaning: (1) the extreme improbability of 1500 miles of a new coast-line having been explored in one voyage; (2) the clumsiness of the expression, which would require the insertion of the words "from the east" to read properly.

The importance, however, of the portion to which I have drawn attention has been hitherto overlooked, or, it seems to me, misunderstood. I have met with only three attempts at explanation, and of these two are confined to conjectural emendations of the inscription.

Canale † reads the first letter *a* instead of *i*, and interprets, "è la sola otinticha," that is, "is the only genuine," the meaning of which is not clear, but is rendered plainer by the bold conjecture of *Desimoni*,‡ who, by adding a couple of wholly imaginary words, "questa carta," makes it read, "This map is the only genuine one"! In each of these cases the second line is read as I have given it, but no interpretation offered.

Even Professor Fischer, misled apparently by the Venetian form *xe*,§ of which he takes the first letter to be the Roman symbol for 10, finds himself under the necessity of supplying a word like *larga*, "broad," and accordingly interprets thus: "Genuine island, X miles broad, stretching 1500 miles westwards." ‖

Of the coast-line itself Professor Fischer's explanation, which is the only one I have seen, seems inadmissible. His conjecture is that it represents the appearance of the Cape Verde Islands to the hasty glance of an early explorer. Not only is it by no means in the position of the Cape Verde Isles, but the definite wording of the legend, especially if Professor Fischer's reading be adopted, precludes such an explanation. There are, moreover, shown approximately in the position of the Cape Verde Isles, two conventionally drawn islands, with the vague title "dos ermanes," which might well represent the record of a hasty glimpse of some of the Cape Verde Islands, caught by a vessel driving by them towards Brazil.¶

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* Published by Ongania of Venice.

† M. G. Canale, 'Storia del Commercio dei viaggi delle scoperte e carte nautiche degl' Italiani,' p. 455. Genoa, 1866.

‡ In *Atti della Societa Ligure di storia patria*, 1864, vol. iii. p. cxiv.

§ Bianco uses the same Venetian form, *xe* for *è*, on his earlier 1436 map—"questo xe mar de spagna," etc.

‖ Fischer, 'Sammlung mittelatterlicher Welt-und Seekarten italienischen Ursprungs,' p. 209. Venice, 1886.

¶ Mistakes in latitude were rarely made. The "ixola otinticha" is distinctly south, while the Cape Verde Isles lie slightly north of the latitude of Cape Verde. The two islands named dos ermanes, "two brothers," are, in their conventional shape and vague name, a marked contrast to the "genuine island." It is noteworthy that when Cadamosto was driven on to the Cape Verde Isles in 1456, *two* were conspicuous at some distance, and only on landing were the other islands seen from a mountain-top.

There is much evidence to show that the fifteenth-century navigators could reckon differences in longitude with greater accuracy than is commonly supposed, and in this connection the distance given, "1500 miles," is of some interest. An inscription on Bianco's 1436 atlas shows that he used the scale of 56⅔ miles to a degree. The distance

"Is there no record of the voyage which resulted in so remarkable a discovery?" one naturally asks. Possibly there may be, but it must be remembered that contemporary records of the period are very scarce, and such knowledge was jealously guarded. There is, however, in 'The Discoveries of the World,' written by Antonio Galvão in the middle of the sixteenth century—an excessively rare book, but rendered easily accessible by its republication in the admirable series of volumes issued by the Hakluyt Society—a reference to a voyage which agrees excellently well.

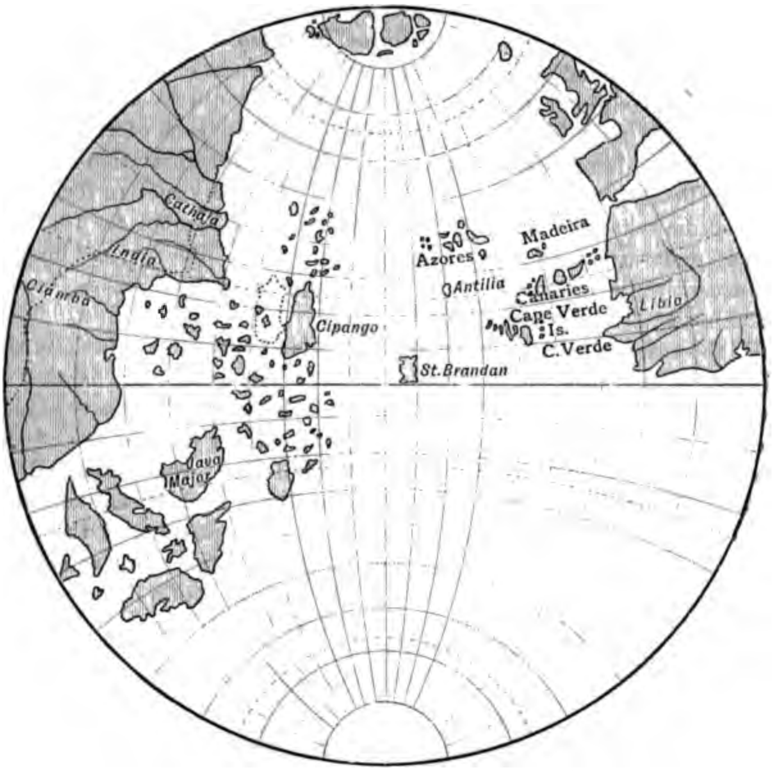

FIG. 5.—PORTION OF MARTIN BEHAIM'S GLOBE, A.D. 1492 (*see note, p.* 230).

"In this yeare also, 1447," says Galvão, "it happened that there came a Portugall ship through the streight of Gibraltar, and being taken with a great tempest, was forced to runne westwards more than

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from Cape Verde to the nearest point of Brazil is 1610 nautical miles of 60 to a degree. Reduced to the scale of $56\frac{2}{3}$ miles to a degree, this becomes 1520 miles!

Too much stress ought not to be laid on this coincidence, as a round number like 1500 may have been used simply to express great distance. Marco Polo uses it frequently; as, for instance, Chipangu 1500 miles from the continent, Chamba 1500 miles from Zayton, Java 1500 miles from Chamba.

willingly the men would, and at last they came to an Island. . . . The boateswaine of the ship brought home a little of the sand, and sold it unto a goldsmith of Lisbon, out of the which he had a good quantitie of gold." [*]

Galvão goes on to state that he is inclined to believe that the island thus found was Nova Spagna—that is, in the West Indies. This may be so, but when it is remembered that at that period Portuguese effort was concentrated on the Cape Verde region of West Africa, it seems equally probable that the "Island" was Brazil, and that Bianco's map, made in the following year, records the fact.

It may be a source of wonder that Andrea Bianco, a Venetian, was able to obtain the important information that his map discloses. The experience of his fellow-citizen Cadamosto, however, furnishes a clue.

This distinguished discoverer fortunately left behind him a written record of his travels.[†] From them we learn that he left his native city in 1454, intending to sail as far as Flanders with the Venetian fleet annually despatched to that country and England. On reaching Portugal, however, he was persuaded by Prince Henry to enter his service, by the handsomest promises, afterwards fully redeemed, for the prince was especially anxious to obtain the help of Venetians.

Doubtless Andrea Bianco, "comito de galia," [‡] as he signs himself on his map, sailed with the similar Flanders fleet six years earlier, in 1448, and, either by the courtesy of Prince Henry himself or in some other way, obtained his information when calling on the voyage at Portugal. He may even have met there the captain of the vessel, which discovered an unknown island in 1447. Anyhow, his information must have seemed of great importance, for he committed it to parchment, in the form of the map to which I have referred, in *London*, without waiting for his return home.

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[*] From Hakluyt's translation, edited by Vice-Admiral Bethune for the Hakluyt Society, 1862. The words omitted are, "which had seven cities, and the people spake the Portugall toong, and they demanded if the Moores did yet trouble Spain, whence they had fled for the losse which they received by the death of the King of Spaine, Don Roderigo." This passage, making the inhabitants a set of 700-year-old Rip van Winkles, is evidently a mere sailor's yarn, associating the Island with the unknown land to which the seven bishops had fled in the eighth century, according to the tradition already mentioned. The essential facts are the discovery of an island, and the finding of gold

The same story is told in the 'Life of Columbus,' ascribed to his son, and generally cited as the 'Historie.' In this case the gold-bearing sand is picked up by the cabin-boys, while the crew are at church. The 'Historie' adds that several expeditions were sent out from Portugal to rediscover the island, and details are given of one which sailed forty years before Columbus' first voyage; that would be in 1452.

[†] First published in 'Pœsi novamente retrovati' (Vicenza, 1507). Cf. H. Y. Oldham, 'The Discovery of the Cape Verde Islands,' in 'Festschrift Ferdinand Freiherrn von Richthofen.' Berlin, 1893.

[‡] Comito = boatswain (Baretti); quel l'Ufiziale che commanda alla ciurma delle galee, e ch' è dipendente dal sopracomito (Contarini).

The full importance of this fact will be best appreciated by those who have studied, in the Venetian State Papers, the conditions under which the intercourse between Venice and London was maintained at that time, and remember the excessive penalties to which a captain laid himself open if he dared to remain for longer than a very limited period in our capital.*

One might at first sight expect to find indications of Bianco's "Genuine Island" on other maps of the period, but a little consideration shows this to be improbable. The exceptional nature of Bianco's 1448 map has been mentioned. On the ordinary portolani, dealing with the Mediterranean, there is no place for such an island; even the rare ones that show the West African coast beyond Cape Bojador have no room for it. Similarly on Fra Mauro's great map of the world, where it might be expected to be found, the edge of the map is drawn so close to the coast of Africa that there is not even room for the Cape Verde Islands, much less for one 1500 miles to the west.

It is, indeed, not till maps dealing with the Atlantic Ocean were made, that an indication of it could really be anticipated.

The first of these we possess is the famous globe of Martin Behaim, made in 1492.† Here the island ought to be, and here it is to be found, as a large island in about the same latitude south of Cape Verde as that in which it is shown on Bianco's map, but moved naturally much further to the west. That it should bear the name St. Brandan is not to be wondered at. The name of the old Irish saint is to be found at different periods attached to most of the great groups of the Atlantic islands, always apparently getting moved on as a group became well known, to one more recently brought to light. On Bianco's 1448 map, for instance, it is to be found attached to the new series of Azores, there shown for the first time; but between 1448 and 1492 the Azores had become better known and properly named, and accordingly on Behaim's globe "St. Brandan" is moved once more, for the last time, however, to find a resting-place on Bianco's "Genuine," but hitherto "unnamed" island.‡

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* The galleys were only allowed to remain in London for 90 days, with 15 for clearing the custom-house. The penalties included a fine of 1000 golden ducats to each master, with privation of office for ten years. Cf. Rawdon Brown, 'Calendar of State Papers' (Venetian), vol. i., 1864.

† The sketch of Behaim's globe used to illustrate this article is adapted from the drawing in Ruge's 'Zeitalter der Entdeckungen,' the best available. Professor H. Wagner has just issued an interesting pamphlet (reprint from *Nachrichten der k. Gesellschaft der Wissenschaften zu Göttingen*, 1894, No. 3) on the various reproductions of Behaim's globe, with a new reconstruction of Toscanelli's map. The true outline and position of the coasts of Asia and Japan on Behaim's globe, according to Prof. Wagner, are indicated by dotted lines in Fig. 5.

‡ St. Brandan's Island is often spoken of as one which was shifted about on mediæval maps from place to place. This is not the case really. It is quite exceptional to find

Why, it may be justly urged, did not the Portuguese make use of such important information, if they had really discovered South America before 1448?

To this one might answer in the manner of the law courts: (1) They were wise in not doing so. (2) They did.

For, *first*, they were right in neglecting everything which tended to divert their efforts to find a route round Africa to the East, especially as Prince Henry had by Papal Bulls obtained rights over all discoveries that he might make from Capes Nun and Bojador, along the African coast, "even to the Indies."

It was doubtless for this reason, as well as from a just confidence that the shortest route to the Indies was really the road round Africa, which for more than half a century they had been seeking, that the Portuguese declined to adopt the western route proposed to them by Toscanelli, even when subsequently urged with all the eloquence of Columbus.

Secondly, that they had not forgotten the discovery seems to be shown in their action, which led to the well-known Tordesillas Treaty. It will be remembered that, on the return of Columbus from his first voyage, the Spaniards sent with almost incredible speed to Rome to demand rights of possession over the new-found land. This was granted on May 3, 1493; but, in order to avoid collisions between Portugal and Spain, on the following day, May 4, a fresh bull was promulgated defining the famous line of demarcation. This line was to be drawn 100 leagues west and south of the Azores, or Cape Verde Islands, and, while the Portuguese retained their previous rights of discovery to the east of the line, similar rights were granted to the Spaniards to the west of it.*

Far from producing peace, however, this line of demarcation aroused a storm of protest from the Portuguese, which was so vigorous and successful that in the following year the Spaniards were glad to agree to the Tordesillas Treaty, whereby the line was shifted 270 leagues further to the west.

What arguments the Portuguese used to obtain this concession, and, still more, what private reasons they had for risking a quarrel with their neighbours to gain it, have never yet been made clear. If, however, as the evidence here adduced tends to show, they had information with regard to Brazil, their reasons become manifest.

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any definite island of St. Brandan. The usual custom in the fifteenth century was to insert an inscription, "Insule fortunate sancti brandani," near the Canaries, Madeiras, or Azores, generally between the two latter. On Behaim's globe the island is not named "St. Brandan," but has beside it a legend beginning "nach christi gepurt 565 jar kam sand brandan mit sein Schiff auf dise Insel." See Kretschmer, 'Entdeckung Amerika's,' kap. iii., for references to the St. Brandan legend.

* The history of the demarcation-line is ably discussed in an article by Prof. E. G. Bourne in the *Yale Review*, vol. i., May, 1892.

Moreover, only on some such hypothesis can be explained the extraordinary proposal made in the course of the negotiations by the King of Portugal, as recorded by Herrera, the official Spanish historiographer of the Indies. "Let the line of demarcation run," the Portuguese sovereign seems to have said, "not from north to south, *but from east to west* in the latitude of the Canaries, the Spaniards to have all new land that they find to the north, the Portuguese all to the *south*, of this line." *

Fortunately for themselves, the Spaniards refused to consider this ingenious proposal, which would ultimately have given to Portugal the whole of South America, but agreed to a shifting of the line so far to the west that the Portuguese obtained that portion which we now know as Brazil.†

Finally, it may be asked, How was it that Columbus, who assiduously collected information with regard to Western lands, did not know of this? The answer is simple and short—He probably did.

Every one who has studied the life of Columbus must have remarked the peculiar course adopted in his third voyage in 1498, when he sailed down to the C. Verde Islands and still further south, before turning to the west. The reasons usually given for this course seem so inadequate, that it is strange that the one given by Herrera should have been generally overlooked, and yet it is as precise and reasonable as could be wished. "He resolved," says Herrera, "*to sail to the southward to find out whether King John of Portugal had been mistaken, who affirmed that there was a continent to the southward.*" ‡

To sum up briefly. The shortest route from the Old World to the New is from Cape Verde to Brazil. Winds and currents tend to carry a ship across. There is, therefore, an inherent probability that a Portuguese vessel should have been driven on to the Brazilian coast. This actually happened to Cabral in 1500. It might have happened at any time after ships began to round Cape Verde. That Cape was first rounded in 1445. In 1448 a remarkable map was made by Bianco, showing the most recent Portuguese discoveries. On it a long stretch of coast-line is shown south-west from Cape Verde, with an inscription saying that it is authentic, and 1500 miles to the west. The only land in such a position is South America. The discovery must have been made between 1445 and 1448. It is recorded that an unknown island was found far to the west in 1447. On the first map dealing with the Atlantic Ocean after Bianco's map, a large island is found in the position indicated by Bianco. The Portuguese had good reason for not troubling much about such an island, until the Papal Bull of 1493 with its line of demarcation, when their conduct leading to the Tordesillas Treaty of 1494, by which the line was shifted so far that they secured Brazil, seems to have been based on knowledge of the existence of land in the position of that country. Moreover, there is evidence to show that they publicly claimed the possession of such knowledge.

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* Herrera, 'Historia General de los Hechos de los Castellanos,' 1601, Decad. i. lib. ii. cap. viii.

† It is noteworthy that the Tordesillas treaty distinctly anticipated the possibility of the line, as agreed on, passing through land, in which case a tower was to be erected to mark it. Humboldt refers to this in 'Cosmos.'

‡ Herrera, Decad. i. lib. iii. cap. ix. "Y determinado tambien de navegar al Sur, por entender si se enganaba el Rei D. Juan de Portugal, que afirmaba que al Sur havia Tierra-firme." The quotation in text is from Stevens' translation. London, 1725.

If the views here set forth are tenable, the interesting and important result is obtained, that America was discovered by the Portuguese in or about the very year in which Columbus is believed to have been born.

Without removing one iota from the real merit of Columbus, it would add the crowning laurel to the already great glory of that marvellous man, Prince Henry the Navigator, who, it is pardonable to remember, was half an Englishman.

Before the reading of the paper, the PRESIDENT made the following remarks: In commencing this new departure it will be necessary that I should give the reason and objects for doing so. It is now exactly forty years ago since the last time that I addressed the Fellows of this Society in their own room, and I do not think any one has ever addressed them in their own room since; so that, so far as I am concerned, I begin just where I left off. We have thought it desirable that there should be occasional afternoon meetings in the map-room, in order more fully to consider and discuss technical and scientific questions which are not so well suited for large popular assemblies. I feel that several branches of our science have hitherto not received due attention, and I trust that by this new departure that want will come to an end. The subjects I refer to are such as that to which we are going to listen this afternoon—touching on historical and comparative geography, on all matters relating to projections and cartography, the production of maps, inventions connected with the scientific and surveying instruments for the use of travellers, suggestions with reference to the more graphic illustration of various problems and of matters that are of interest to travellers by diagrams or otherwise; also subjects relating to questions of spelling and geographical nomenclature; and, in short, all such subjects as require careful and critical consideration and discussion at the hands of experts. I think we are fortunate this evening in commencing the study of the history of our science by considering one of the very early maps of the fifteenth century. Mr. Yule Oldham will be kind enough to explain to us some peculiarities in one of the early maps of Andrea Bianco, will tell us how he deduces from these peculiarities his own conclusions that America was discovered at a much earlier date than is generally supposed to be the case, and he will also show us reasons for his conclusions. I am sure that the paper will be well received, for the pupil of von Richthofen and the god-son of my old friend Sir Henry Yule, who was so long at the head of this branch of geographical inquiry, is entitled to receive from the Fellows of this Society a cordial reception whenever he is good enough to address us. I now call upon Mr. Yule Oldham to read his paper.

After the reading of the paper, the following discussion took place:—

Mr. E. G. RAVENSTEIN said that the author of the paper just read had placed the subject before them in an admirable and lucid manner, and he therefore regretted all the more that he could not agree with him as to the supposed pre-Columban discovery of America. "Longa a ponente 1500 mill" in the legend on Bianco's map surely meant "extends 1500 miles to the west," and if this was so, all idea of Brazil must be excluded. Nor could he look upon this fanciful island of almost continental extension as recording an early and unrecorded discovery of the Cape Verde islands. Azurara's Chronicle, he thought, presented them with a full statement of all the Portuguese expeditions which had been fitted out up to 1448, and not a hint was to be found there as to any tremendous discovery such as that shadowed forth in Bianco's map. Reference had also been made to Behaim. He thought that cosmographer a much over-rated man, who became famous without having done anything to deserve fame. His globe was made at the suggestion of the Nüremberg town council, and Behaim, as well as the artists who actually did the work, was well paid for it. As a geographical document that globe possessed very little value. Not only had Behaim filled the Atlantic with fabulous islands; he had also given a monstrously incorrect delineation of the coast of Western Africa, which he claimed to have explored in company of Diogo Cão. Any Portuguese pilot, furnished with an astrolabe and the ephemerides of Abraham Zacut, could have determined the latitudes more accurately than appeared to have been done by Behaim, who claimed to be a disciple of the famous Regiomontanus. On this globe the Cape Verde islands were shown hundreds of miles out of their true position, whilst Antilia, or the Island of the Seven Cities, was a mere myth. Galvão stated that in 1447 a ship, driven to the westward by a storm, discovered this Island of the Seven Cities. On the face of it, this record of the usually very sober Galvão was fabulous, for the inhabitants of the island are stated to have asked whether the Moors still occupied Spain, from which they had fled more than seven hundred years ago, after the battle of Xeres de la Frontara. No island in any way corresponding to that referred to had ever been discovered. As to Cabral's discovery of Brazil, it certainly was not due to any knowledge which the Portuguese might have possessed of the existence of land in that direction; it was the necessary sequence of the sailing instructions with which he had been furnished. These instructions were a confidential document, and any knowledge in possession of the crown, and likely to be of use to the navigator, would have found its way into them. The Portuguese were certainly not a people who put their lights under a bushel; had they been able to produce even a shred of evidence in favour of the contention that they discovered America before Columbus, they would long since have done so, and they would have pointed out that only the mistaken policy of secrecy, which governs even now a good many government departments, had deprived them of the credit which otherwise they would have won among the peoples of the world.

Mr. E. J. Payne, while fully recognizing the value of Mr. Oldham's paper, felt compelled to dissent from his conclusion. What did Bianco's map prove? Not that any one had discovered South America, but simply that the map-maker believed in an island in that part of the ocean, an island designated on the map "Otinticha;" and this name was probably a misreading for "Antilia."

Mr. Oldham interposed with the remark that he would value very much any remarks that Mr. Payne might make, but he begged him not to pursue that line of argument, inasmuch as Bianco's map of 1436 showed Antilia in its usua. position to the west of Portugal. It was hardly likely that the same man would so strangely contradict himself as to place the island of Antilia in a totally different place some twelve years later.

Mr. Payne replied that this was precisely what the progress of discovery compelled Bianco to do. Since 1436 the Azores had been discovered, and found to occupy the very part of the ocean in which older maps had placed Antilia. This island, therefore, had to be moved further south; "Brasil" and St. Brandan's were similarly moved southward as the exploration of the northern Atlantic proceeded. If "Otinticha" did not represent Antilia, this latter island, which was still universally believed in, disappeared from Bianco's map altogether—a very unlikely thing to happen. Bianco obtained his information in Portugal, on his way from Venice to England. He must there have seen the new discoveries drawn on a Portuguese map; and on such a map "Antilia" would be written "Antilha." Five out of the seven letters in "Antilha" were found in "Otinticha" (the "nti" in the middle and the "ha" at the end). The cursive capital "A" often began with a small flourish, which might easily be misread as "O"; and if the cross-line of the "A" were terminated to the right by a short vertical dash, this letter might easily be mistaken by a foreigner for "oti." It was only necessary to suppose the "l" in "Antilha" to have been a trifle shorter than usual to make "Otinticha" a very probable misreading of "Antilha." After criticizing Mr. Oldham's reference to Galvano, and his contention that "Otinticha" had been omitted from subsequent maps because room could not be made for it, Mr. Payne remarked on the similarity of outline presented by Biánco's "Otinticha" and the "Antilia" of contemporary mapmakers. In laying down imaginary islands, cartographers might be allowed some licence; if they moved them about in the ocean, they might well be allowed to turn them round. In conclusion, he again alluded to the industry and ingenuity displayed by Mr. Oldham in his endeavour to throw new light on the somewhat stale but ever-fascinating question of the first discovery of America, and added that he should join most cordially in the vote of thanks which would no doubt be accorded to him for his interesting lecture.

Commander **Hull** said he had been much struck with Mr. Yule Oldham's theory of the Portuguese discovery of South America by having been blown upon that coast. He happened to have sailed in a ship that may be said to have discovered America by accident. H.M.S. *Herald*, in 1845, when bound to the Pacific, meeting with south and south-east winds after clearing the Doldrums, stood resolutely to the westward instead of tacking to the eastward, crossing the line in 30° W., and so was forced to sight first Fernando de Noronha, and then the coast northward of Pernambuco; making, nevertheless, a good passage to Rio. The island shown on the last map would fairly represent Fernando de Noronha. He thought the Portuguese story a very probable one.

Mr. **Morgan** congratulated the Society on having their new series of meetings inaugurated by so interesting a subject as that now brought before them. He considered Mr. Oldham's arguments in support of his theory very convincing, though, of course, in introducing such a new idea as a pre-Columban discovery of America, he had to contend against the old and rooted opinions that had prevailed so long. As far as it was possible to judge from the photograph of Bianco's map, the coast line in the south-west corner with its inscription could only refer to Brazil. Other readings had been suggested, but these all rest on a supposed omission of words or parts of words in the original. Mr. Oldham's interpretation seemed to him (the speaker) the right one, if the word "longa" had the same meaning as "lontana." Sailing ships of the fifteenth century were almost at the mercy of the winds, and it was highly probable that the Portuguese, in sailing down the west coast of Africa, were blown across the Atlantic.

Mr. **Raymond Beazley** disagreed with Mr. Oldham. He had just been examining the photographs of the map in question in the British Museum, and Mr. Coote agreed with him in the belief that the "Genuine Island" referred either to one newly discovered to the south-west of Cape Verde, or else was an allusion to such a mythical country as Antilia. The contention that it was Fernando Noronha, or even Ascension, was more probable than that it was part of the continent. Mr. Oldham surely would not maintain that the islands of Antilia or the Seven Cities existed in reality. His contention about the fleets of the Portuguese constantly getting astray was against the evidence. He had spoken of ten or twelve ships sailing together down the African coast in Prince Henry's time, but, as a matter of fact, fully twenty-eight vessels sailed in (*e.g.*) 1445 from Lagos, but the track of every one of these was accounted for, and its return to Portugal stated. The *possibility* of such a voyage as Cabral's occurring earlier was a strong point, but his own discovery was surely accidental. Cabral was simply directed to look for new lands *en route* for India, and there was no certain knowledge of a continent in that part of the world to guide him. He stood out to escape the currents of the Guinea Coast, and so found South America. Mr. Oldham's explanation of the inscription was not convincing, and they could not fairly infer that his reading was correct. The conventional islands which were put north and south, with their points facing one another, were like the Brazil Islands, to be found in so many maps. This autumn the speaker had looked through the Portolani of the Bodleian Library, and on four of them he found these conventional islands, but he believed this "Isola otinticha" of Andrea Bianco's, south of the conventional islands, had no more claim to be regarded as proof of a discovery of America than an inscription on one of those Oxford maps, "Isola d'Isepanyola," slightly to the south of the conventional Brazil, west of Ireland. The line of the coast of Mr. Oldham's island also seemed to be in a contrary direction to that required by reality. Lastly, the scale of the map was very large, and yet the distance between Africa and the new land was extremely small—it was not much more than between Gomera and the continent—and that could hardly be explained away. The arguments about the want of space seemed to be inconclusive, because, if a discovery so important had been made, mere want of space would not have been allowed to rule it out of all maps between 1445 and 1492.

Dr. H. SCHLICHTER: Mr. Oldham's interesting paper opens a large field for discussion. Mr. Oldham correctly mentioned that on the first map dealing with the Atlantic Ocean, after Bianco's map—namely, Behaim's globe of 1492—there is a large island shown in the position indicated by Bianco. This island is described as the island of St. Brandan, who is supposed to have reached it with his ship, according to Behaim, as early as in the year 565. This statement leads us at once to the old and often-repeated story of the fourteenth and fifteenth centuries on the islands of Saint Brandan and Antilia, about the existence of which many Portuguese and Italian navigators and cartographers of that age seem to have had no doubt whatever. Already the map of Pizigano (1367) contains the island of San Brandany; and another very interesting map of the year 1425 has the islands of Saint Brandan and Antilia. Alexander von Humboldt, who has described this last-named map, is of opinion that it is of Italian origin. A third map of great importance is the first map of Bianco from the year 1436 (which has already been mentioned this evening), and besides that Humboldt describes a planisphere of Bianco, which, according to some authors, contains indications that it is partly copied from a fourteenth-century map containing information even older than Marco Polo. On both these maps of Bianco—which have been drawn prior to the one in question—there is represented a large island called Antilia, carefully drawn, so that Humboldt correctly remarks, that the outlines of the coast are drawn so distinctly that one might suppose the island had been actually surveyed. This same island we find again on Martin Behaim's globe, with the only difference that it is called there St. Brandan, whilst Antilia on this globe is a smaller island more to the north.

Now, if we compare all these maps with the map in question, viz. the Bianco map of 1448, we can have, I believe, no reasonable doubt that the island which Bianco puts down west of Cape Verde, and which is described in that peculiar way mentioned by Mr. Oldham, is one of the two hypothetical islands which are described by the cartographers somewhat indistinctly either as Antilia or the island of Saint Brandan. Although none of all the maps mentioned seem to show any doubt about the existence of one or both of these islands, yet their positions are constantly shifted about without any critical considerations. It is, however, evident, from a comparison of the above-mentioned maps, that these islands, in which everybody believed, but which nobody had seen, were placed more and more southward and westward in strict proportion with the progress of the Portuguese discoveries. Thus on the map of 1425 the island of Antilia lies within 5° to the west of Cape Bojador; whilst, as we have seen, on the maps of Bianco and Behaim it is far more distant from Europe and Africa.

I have not mentioned the Benincasa maps, the dates of which fall between Bianco and Behaim; these also contain the island of *Antilia*, but as it is somewhat doubtful whether it is not a later addition of the sixteenth century, I consider it best not to rely upon this evidence. But as regards Martin Behaim, it is evident, from the shape and position of his island of Saint Brandan, that he has used the maps of Bianco—or such from which Bianco copied, if he did—taking the shape from the 1436 map, and the position from the 1448 map. Thus we find Martin Behaim's large island lying close to the equator, and in the middle between Japan and Africa.

All this leaves no doubt to my mind that no such island was really discovered, but existed only in the imagination of navigators and cartographers of the fifteenth century. Nor is the origin of the mystery far to seek; for a complete story about a very old Portuguese colony in the middle of the Atlantic is given in detail by Martin Behaim. Alexander von Humboldt correctly remarks that such stories were readily believed in those times, and became so deeply rooted that nobody disputed them seriously. This hypothetical Atlantic colony was known as the colony of the *Seven Cities*, and these were supposed to be situated on this very island of Antilia, as is proved by the independent evidence of Martin Behaim, and of Toscanelli, in one of his letters to Martinez, in which the following passage occurs: "The island of Antilia, which you call that of the seven cities. . . ." This, I think, is the light in which we have to regard the statement made by Galvano to which Mr. Oldham has referred. For in the same passage, immediately after the lines cited by Mr. Oldham, the Portuguese language, the Moors, and Spain are mentioned.

But there is, moreover, also strong direct evidence in favour of Columbus, viz. the report of the great Portuguese writer, De Barros, about the reception of Columbus at the Portuguese court, when he returned from his wonderful journey. The graphic description of the anger and annoyance of the Portuguese at the quite unexpected success of their rivals, and their envy and rage against the somewhat arrogant discoverer—which only by the personal intervention of the king did not take a dangerous turn for the latter—all this proves plainly enough, that if they had had any claim respecting a previous discovery of the New World, they would not have omitted to emphasize it. We can, further, plainly see from De Barros that also later on, when the subject of Columbus's discoveries was fully discussed between Spain and Portugal, the Portuguese were unable to produce any evidence of a pre-Columban discovery of America.

Mr. A. S. Bicknell asked why Mr. Oldham thought the island on his map was the continent of Brazil, when the position corresponded with that of Trinidad, and no discoverer would plot a coast as a square island. If the course from Cape Verde, however, was south-west, Fernando Noronha would be struck, and the 1500 miles marked might simply be an explorer's exaggeration, or indicate the length of his ocean voyage.

Mr. Oldham, in reply, said: The island on Bianco's map cannot reasonably be expected to represent a survey of a coast; while believing it to indicate Brazil I do not attempt to identify it with any particular part of that country. One of the cardinal rules of translation is to take the meaning that makes the best sense. It is, therefore, natural to adopt the meaning "genuine island, distant to the west 1500 miles," rather than "is 1500 miles long to the west," which in comparison is meaningless and pointless, quite apart from the extreme improbability of 1500 miles of coast-line having been explored in a single voyage. I cannot attempt to answer Mr. Ravenstein's denunciation of Behaim, as it does not affect the main question; but to say, as more than one has done, that the discovery of South America in the way I have maintained would have been a "tremendous" affair, seems to show a complete misunderstanding of the state of knowledge in the middle of the fifteenth century. No one at that time would have realised what such a discovery meant. It would have been simply one more island in the western seas. No one expected to find a continent. There was no suspicion of there being a continent to find, and the small part explored would naturally seem only a portion of an island. To Prince Henry such a discovery was probably not one to be received with enthusiasm, but rather to be put aside as likely to distract attention from the prosecution of his more profitable and ambitious projects along the African coast. My own studies in mediæval cartography prevent my accepting the views expressed by Mr. Payne and Dr. Schlichter with regard to the shifting of islands, and the former's suggestion that "Otinticha" is a misreading of "Antilia" seems so unlikely and unnecessary, that I must leave it to the sense of the meeting. Both before and after Bianco the position and form of Antilia was practically constant, and neither in size, shape, nor situation does the "Otinticha" island resemble it. Mr. Beazley's contention that Ascension was more likely to have been discovered than South America, can only be based on a complete misconception of the prevalent winds and currents in the Atlantic, which Commander Hull's practical experience should help to remove. I was well aware that more ships sailed from Portugal in one year than I spoke of, and trust that my smaller figures may be taken as an example of the spirit of moderation in which I have tried to express my views! I cannot, however, accept the statement that the track of every vessel was known. While thanking Mr. Morgan for his support, I cannot help regretting that many of the main points of my argument have not been touched upon in this discussion. I did not expect to convince all my hearers, because every one naturally approaches a question of this kind unconsciously prejudiced by his original views; but I feel confident that the more it is examined the more will the line of arguments adopted be found to be a sound one, the investigation of which will lead to new discoveries tending to establish its truth. Anyhow, it has been a particular pleasure to me to bring it before the Society this afternoon.

The President said that the admirable paper which they had heard at all events showed how very interesting the study of the Portolani was. These islands and rocks scattered about on their maps of the Atlantic Ocean by the old cartographers led to most fascinating speculations, and to further investigations into the by-paths of history and geography, all of which tended very much to increase our knowledge. He thought that Mr. Oldham had marshalled his arguments with great skill, and they also had to thank him for the extremely interesting photographs that he had provided for them. As President, he should claim the right to reserve his opinion, for the present, on the particular point that had been discussed that evening, even if the time admitted of his continuing the discussion; but he wished that hereafter Mr. Yule Oldham, or some other student, would give them a history of these Portolani of the fourteenth and fifteenth centuries, and tell them all that was known about the authors, the kind of information they collected, and the system upon which they drew their maps, and also trace out the history of these islands which they scattered over their maps of the Atlantic, and the positions of which were so often shifted. He desired to propose a most cordial vote of thanks to Mr. Oldham, for the extremely interesting and valuable paper presented to them, which he hoped would lead to further investigation.

NOTE ON MR. YULE OLDHAM'S THEORY OF THE DISCOVERY OF AMERICA IN 1447.

By the PRESIDENT.

Mr. Yule Oldham has called our attention to a curious marginal note on the old map drawn by Andrea Bianco in London in 1448. It is at the foot and quite at the edge, and consists of a coast-line and a legend of two lines. The map has been cut close to the letters, and there may well have been another line. What remains is very illegible. It has been interpreted by experts as follows: "*Authentic Island is distant to the west* 1500 *miles.*" Mr. Yule Oldham believes that this means that a Portuguese vessel had sailed from the Cape Verde islands to Brazil, by a south-south-west course, and discovered America at some time before 1448. Galvano (1555) mentions the tradition of a vessel having been blown to the westward in about 1447, so Mr. Yule Oldham takes this as the date of the supposed voyage.

Mr. Yule Oldham has marshalled his materials and drawn up his argument with great ability. I regret very much that I am unable to follow him, though I am quite open to conviction. I am not at present quite convinced that the marginal note may not have been written by another and a much later hand, nor that the legend is correctly deciphered. But, assuming this to be the case, I am still encountered by difficulties which appear to me to be insurmountable.

I hold it to be extremely improbable that a Portuguese vessel can have crossed the Atlantic in 1447. She would not have done so intentionally, and if she had been blown off the shore by a gale, she would have used every effort to return as soon as the wind abated.

The legend, as interpreted, gives the course as west. Mr. Yule Oldham's suggestion, that the vessel's course was south-south-west to the coast of Brazil, therefore seems to me to be inadmissible. On a west course from the Cape Verdes, a distance of 1500 miles, which is sure to have been exaggerated, would not have taken her anywhere near America; and a west course, at least within two or three points either way, is a necessity, if any argument is to be based on the legend as deciphered by experts. I am afraid, therefore, that the theory of a discovery of America in 1447 cannot be admitted.

No departure is given on the legend. I cannot suppose that no departure was originally given, for the legend is unmeaning without one; and this increases the probability that a line has been cut off. To suppose that the departure was from the Cape Verde Isles, or any other point, without any authority, is a purely arbitrary assumption. But if, as Mr. Yule Oldham believes, Galvano alludes to the same voyage, he does give the departure. It is from the Strait of Gibraltar, course westerly, and the distance "much farther than they wished." A westerly course (N. 80° W.) and a distance of about 1200 miles (which would be quite 1500 by such a dead reckoning as would have been kept in 1447) would have brought a vessel to one of the Azores. The legend on Bianco's map, by the light shown by Galvano, is thus explained. A vessel was blown out of the Strait of Gibraltar in 1447 westerly, for a distance reckoned at 1500 miles, and the "authentic island" was one of the Azores. The Azores are shown on the Laurentian map of 1351, and had been copied into others, including one by Bianco himself, dated 1436. But they had not been visited for nearly a century, and had to be re-discovered before their authenticity could be established. St. Mary had been re-discovered in 1432, and St. Michael in 1444. The re-discovery of another of the Azores further west, perhaps Flores, in 1447, would establish the authenticity of the other western islands on Bianco's map of 1436, and naturally led him to refer to it as an "authentic island;" of the visit to which he may have just heard at Lisbon after his map was completed, on his return voyage from London. This, I am inclined to think, may account for the curious marginal note on the map of 1448; assuming that it is in Bianco's hand, and has been correctly deciphered. Galvano's seven cities, and inquiries after the Moors, are the natural accretions which the story of this voyage to Flores had received in the course of another century.

A TRIP TO TURKISTAN.

By Captain H. BOWER.

Towards the end of 1888 I happened to hear that my friend Major Cumberland was contemplating a visit to the Pamirs in search of *Ovis Poli*, and was anxious to find a companion; so I determined, if matters could be arranged and leave obtained, to accompany him. Shortly afterwards he came to Ferozepore, where I was quartered at the time, and we were able to talk over things together. Then he started for Kashmir, and I put in an application for a year's furlough. This was granted, and on June 14, 1889, I left Ferozepore by rail for Rawul Pindi; thence I pushed on as fast as possible to Srinagar, the capital of Kashmir, which was reached on the evening of the 17th. But I need not have hurried, as the first news I heard on arrival was that it was of no use going on, as the rivers in Raskam, a country we had intended to traverse, were sure to be in flood owing to the melting snows. As neither of us cared much for Srinagar, we determined to push on to Leh, and do whatever waiting had to be done there; so we left Kashmir on the 22nd, and reached Leh on July 7. At Leh we met M. Dauvergne, whose intention was to make the same trip as ourselves, and who was taking up a small tablet to place on the spot where Mr. Dalgleish had been murdered the previous year. Our original intention had been to leave the Leh-Yarkand road at Aktagh, and then turn west by Raskam and Sarikol to the Taghdumbash; but before leaving Leh we were informed by Captain Ramsay, British Joint Commissioner, that we could not be allowed to proceed unless we signed a paper promising not to go through Raskam, as it was considered unsafe owing to the marauding bands of Kunjuts. These Kunjuts have for many years been a pest to all law-abiding, peaceful people in their neighbourhood. From their country of Hunza they would issue forth, and, taking advantage of the night—for they never attacked by day—fall on some unsuspecting camp of Kirghiz or traders, and, having plundered everything they could lay their hands on, carry the unfortunate people off to slavery. So much was their very name hated, that I have heard a man describe a wind as a Kunjuti wind when he wished to describe what we would call a bitter, cruel wind; to his mind that word "Kunjuti" summed it all up. They were not a brave people; night surprises and ambushes were what they excelled in. Secure in their mountain fastnesses, they judged themselves invincible, until Colonel Durand's brilliant little campaign awoke them from their fools' paradise, putting a stop for ever to their raids, and now the Raskam route to the Taghdumbash is as safe as any other. It was a matter of very considerable inconvenience to us not being allowed to go that road as we had intended. The only other route we knew of to the Taghdumbash was round by Yarkand, which would have taken twice as long. However, our caravanbashi, on being consulted, said that he had once heard that from some place on the north side of the Killian pass a road ran east, which would most likely take us there.

Having got together a caravan of fifteen ponies between Major Cumberland and myself—M. Dauvergne having his own separate—we left Leh on July 27, and, crossing the Khardung pass, where our things had to be carried on yaks, descended into the Nubra valley.

From Charlung, at the head of the Nubra valley, to Shahidulla there is a very bad stretch of country which takes about eight days to cross, and contains three passes—the Karakorum, 18,550 feet; the Sasser, 17,800 feet; and the Suget. Struggling over stones and through snow at these altitudes with heavy loads tells terribly on horseflesh; the whole way is strewn with the bones of traders' ponies that have died on the road. On the Dipsang plains the long line of white bones stretches across like a ribbon, and no one could miss the road.

On the Karakorum we built a pyramid of stones, and on it placed the tablet in memory of Mr. Dalgleish that M. Dauvergne had brought. At Shahidulla, where there is a small encampment of Kirghiz, the grazing is good, so we halted there for a few days to give the ponies a much-required rest. Furdikul, the chief or akskal (literally, "white beard"), paid us a visit, and we entertained him with tea, biscuits, nuts, etc. Amongst the Turkis, before sitting down to any repast, a great deal of stroking of beards goes on; then the formula "Allah o Akhbar" is repeated, and every one kneels down on both knees, sitting back on their heels, a most uncomfortable and constrained position. The host usually requests his guests to sit at their ease; they then sit cross-legged. At the conclusion of the repast all beards are again stroked, and "Allah o Akhbar" is again repeated.

After leaving Shahidulla we marched down the valley of the Karakash river, which had to be forded twice, while the Tograsu, a tributary, had to be forded once. The latter, though holding much less water than the Karakash, is the most difficult to cross owing to the stony nature of the bottom; ponies often stumble, and once down they never can rise again, but are invariably drowned. We were fortunate in getting over without any loss, and, turning up a side valley, commenced the ascent of the Killian pass. Near the top it was covered with snow, sufficiently deep and soft to give the ponies a great deal of trouble in getting over. This pass is nearly always rather difficult to cross, and, though not as bad as the Sasser or Kulti i Kandhar, it is bad enough to make it advisable to have all the ponies' loads put on to yaks. On the north side great numbers of Ram chickore, or Himalayan snow cock, were to be seen running about, and half a dozen shot without the least trouble came in handy for the pot. On this side the soil is of quite a different character to that on the southern side; the disintegrated rock that forms the barren soil of Ladakh is replaced by fine yellow soil, and away to the north the dust blown up from the desert could be seen hanging over the plains of Turkistan. At the place where we camped after descending from the pass, a shepherd resided who owned a fine golden eagle. These eagles are much used for hunting gazelle, foxes, and hares in the flat country through which the Kashgar and Yarkand rivers flow. It is capital sport, and during the time I was in that country I was fortunate in seeing some of it. The eagle, on being released, does not go off nearly as quickly as a hawk, but takes some little time overtaking the quarry; and in the mean while, if the quarry is a gazelle, the hunters must ride as hard as their horses can go, as the eagle, on overtaking it, simply settles on its quarters and turns it over. If no one is up to come to the eagle's assistance, the gazelle gets free, while the eagle sits still on the ground, refusing to rise.

Leaving Khusghum, the camp where the shepherd lived who owned the golden eagle, we kept on in a northerly direction for about 12 miles; then, turning west up a valley, we left the Yarkand road, and with it known country, to try and find a new route to the Pamirs. The country as we advanced improved in character; grass became more plentiful, and camps of Wakkhi nomads were continually met with. These Wakkhis are an exceedingly interesting Aryan race of good physique, fair and decidedly European in appearance, courteous, and hospitable. We found them a charming people to travel among. Like the Kirghiz, they own immense numbers of sheep, and move from place to place in search of pasturage. During the daytime the flocks are to be seen grazing on the hillsides, and in the evening they are driven into the camp and tied up to be milked. North and south of our route magnificent snowy ranges ran east and west, connected by ridges generally about 14,500 feet high. These ridges had to be crossed, and as a rule one was included in each day's march. They presented no difficulty beyond the long ascent and descent, which was trying to the laden ponies. The only game we saw was hares and chickore; but ibex and burhel are undoubtedly to be found in the neighbourhood, as we saw their horns adorning mazars (shrines).

Near Ak Masjid we met a Russian exploring party under the command of Colonel Pevtsov. They were installed in yurts, by far the most comfortable form of movable habitation in cold weather. Owing to their transport animals having suffered considerably on the march, Colonel Pevtsov's intention was to halt for a month, in order to allow of their picking up. The escort consisted of twenty-five Cossacks, firstrate men for rough work.

After parting from the Russian party, we marched down a valley which emerged into the Turkistan plain at a small village just south of Kugiar. On our arrival at the village, a Turki brought us a lot of most delicious grapes and melons, which we thoroughly appreciated after our long thirsty march, having come 25 miles without seeing any water on the road. On the barren plain outside the little cultivation that surrounded the village, a few gazelle, or, as they are called in Turki, jeran, were to be seen wandering about apparently grazing, but what they found to eat was a mystery.

From this place we turned west once more, and crossed some low barren sandhills. It was a long trying march, more especially for the ponies, which kept sinking in the soft sand over the fetlocks at each step. We had been going for eleven hours before Oshlegh, a charming village situated in the valley of the Tiznaf river, was reached. This valley is about a mile broad, with high cliffs on each side. The soil is a rich alluvial deposit, cultivated like a garden, and the river of bright clear water winds about from one side to the other. Apricots, mulberries, melons, grapes, pumpkins, walnuts, and apples which have a reddish tinge like blood-oranges are abundant, while Indian corn appears to be the staple cereal. Villages, in the ordinary acceptation of the word, hardly exist, but the whole valley is studded with farmhouses, and a name appears to be given to the part of the valley enclosed by each bend of the river. From Oshlegh, another march over low sandhills took us to Oyung, a village situated in a valley of much the same character, but much smaller; the river also is smaller, and almost entirely used up by irrigation canals. Ploughing was going on, the plough used being of almost the same pattern as the one the Indian peasant carries on his shoulder from his house to his field. But the cattle differ from the Indian ones in being humpless; occasionally one was to be seen yoked in a plough with a pony.

For two days we marched up this valley, camping the first day at Thangneassi and the second day at Mazar Urzi. Innumerable donkeys were met with on the road, carrying pine poles from the fir-clad slopes to be seen in the south to Kargallik, to be used in the construction of a new bazaar. At Mazar Urzi, where three valleys meet, the character of the crops was quite different from that of those further down. Oats and peas had taken the place of Indian corn, and the soil was of a much poorer and more stony character. Turning up the westernmost of the three valleys, and crossing an easy pass covered with grass and trees on which many Wakkhis had pitched their tents, we descended into a narrow gorge running between stupendous cliffs, which rose sheer up from each side to such a height as almost to shut out the light. At midday, with a bright sun shining outside, the bottom of the ravine was wrapped in twilight.

Before reaching the small fort of Eghi Zarak Kurghan, beside which we camped, we were out of this marvellous gorge and in the full light of day once more. The fort is a rectangular building about 50 yards square, with walls about 12 feet high, of dried mud. It contains no garrison, but the officials connected with the copper-smelting carried on there have their quarters in it. These officials, although Turkis and Mohammedans, wore pigtails, a custom adopted from their Chinese masters, who insist on all officials following the Chinese custom as regards the way they dress their hair. I found afterwards that many Turkis other than officials followed the same fashion, in order to curry favour with the powers that be. Close to the fort there is a small stream containing abundance of small trout-like fish. Major Cumberland tried them with a fly, and found that they rose readily, the result being a dish of fish which was excellent eating and a pleasant change. From Eghi Zarak Kurghan we crossed the Arpatalla pass and descended to the village of Langar, which is situated just below the junction of the Tung and Yarkand rivers, amidst barren precipitous mountains. The ferry is about a mile above the village, but no rafts are kept ready; when wanted they are made by the villagers from inflated skins and poplar poles. This raft is tied by a rope to a horse's tail; the horse is then driven into the water and guided by a man strapped to an inflated skin who swims alongside. How our things got safely over has been a puzzle to me ever since. The raft was of the craziest description, and swayed about in the current, threatening to capsize every minute. All our things got wet, but no disaster happened, and nothing was missing when an inspection of our baggage was made in the evening.

Ablasum Beg of Sarikul, with a crowd of attendants, was on the bank awaiting us. He is supposed to be more or less insane, and is given to fits of uncontrollable passion, in which he has killed several people. We were particularly requested by his subjects not to allow him to handle our guns, or, if we did so, to say that we had no ammunition, as they much feared that, with a new sort of gun in his hands, he would be unable to resist the temptation to try its effect on some of the onlookers. To us he was civil enough, but there is no doubt about his being of weak intellect, and the Chinese are sufficiently conscious of it to have nominated his son, Kasim Beg, as ruler of the country.

It took all day to get our things over the river, so it was too late to go any further that night, and we pitched our tents close by. Next morning we moved about 4 miles up the Tung valley, and camped close to the Beg's house. There is no collection of houses forming a village, but the lower end of the valley is covered with scattered farmhouses on well-cultivated land. Hearing that the Beg expected us to pay him a state visit, we did so, taking with us some presents of cloth and brocade. He received us in a sort of courtyard, round which there was a raised platform covered by a roof supported by pillars. As we entered he met us, and, leading us to a place where a handsome Khoten carpet was spread, invited us to be seated. Then the inevitable *dastarkhan*, or repast (literally, "tablecloth") was brought in; it consisted of masses of boiled mutton, huge slabs of bread, and wooden bowls filled with curds. It was plain and wholesome food, but, though we did our best, we could make no apparent impression on the enormous quantity produced. Giving it up as hopeless, we expressed our satisfaction, and the remainder was handed over to our servants, who soon made a clean sweep of everything. We took our departure amidst a deal of bowing and much exchange of high-flown compliments. Next day we pursued our way up the valley of the Tung river, passing some scattered patches of cultivation in which slaves were working; they had originally been stolen from the neighbourhood of Gilgit by Kunjuts and sold to the Sarikolis. They seemed quite happy, having married and settled down, and expressed no wish to return to their native country. Soon the valley became so narrow as to be nothing but a gorge, and we were continually crossing and recrossing the river. Owing to the rocky nature of the bed, it was a very trying march for the ponies; they staggered and stumbled about over the stones, continually falling and often cutting their legs. Emerging from the gorge above the snow-line, we found ourselves at the small Kirghiz encampment of Rabut, situated on a bitterly cold spot just under the Kotli-i-Kandhar pass. Here we halted for a day, making a bargain with the people for yaks to carry our baggage over, and then continued our march.

The pass was easy with the exception of about 150 yards near the top; this bit was so bad that it took us three hours to get the animals over it. All hands had to work their hardest, as the ponies had almost to be carried over, and the altitude—about 17,000 feet—added much to the exertion both for man and beast. After crossing we descended into the valley of the Wachi river, in which there is a little poor cultivation. The houses bear evidence of the fear the inhabitants live in of their neighbours on the south, the Kunjuts; instead of scattered farmhouses, one invariably finds several houses joined together and presenting a fort-like appearance. From this valley we crossed the Ogriat pass and descended into the Taghdumbash valley at a place about 6 miles south of Tashkhurghan.

The valley of the Taghdumbash extends from Tashkhurghan to the Kunjerab pass, with a branch on the west known as the Karachunkar valley, and a smaller one in the east, up which runs the road to Raskam. The main valley has an average width, as far as the ruined fort of Khurgan i Ujadbai, of 3 or 4 miles; after that it gradually narrows. The Karachunkar valley is much narrower, being probably nowhere a mile wide, and generally much less. The scene is bleak and dreary in the extreme, a few patches of grass along the river-bank and some boortsa (*Eurotia*) on the hillsides being the only vegetation in sight as we entered; but near the passes at the head *Stipa pennata*, the crisp nourishing grass of the Pamirs, is plentiful. At Tashkhurghan there is some cultivation, but higher up a few square yards of poor-looking barley at Dubda and Khusghun is all one meets with.

Two camps of Kinghiz graze their flocks on the Taghdumbash—one having its head-quarters in the Karachunkar branch, and the other towards the Kunjerab pass. The akskals or headmen of both these encampments treated us with great politeness, and rendered material assistance by supplying sheep, milk, butter, and a sort of clotted cream, of which they consume large quantities; as also with guides to show where the *Ovis Poli* were to be found. But one of them, Kuch Mahomed Beg, akskal of the Karachunkar party, bore a bad name amongst his neighbours, owing to his intimacy with the much-hated and dreaded Kunjuts.

We determined to try the Karachunkar valley first, and marched up it to a place called Kukturruk, just under the Wakkhis Jai pass leading to Wakkhan. There we pitched our camp by a half-frozen stream, in a sheltered spot that had apparently been used by the Kirghiz for ages to shelter flocks and herds in. The soil where the animals had stood dug out like peat and burnt readily, so we were well off as regards fuel, which is generally the great difficulty in these regions. When we got there at the end of September, snow was lying in patches on the southern slopes of the hills and in unbroken sheets on the northern. We did not lose any time in commencing our search for *Ovis Poli*, but luck was very much against Major Cumberland and myself, and after ten days' hard work he had only got two and I had only got one, so we decided to try the Kunjerab pass. Mr. Dauvergne was more fortunate, and, having got three in his first two days, he set out for the Wakkhis Jai pass, in order to return to Kashmir *viâ* Gilgit; so we parted here.

On the Kunjerab we were much more successful, but it was terribly hard work. With the very first streaks of light the *Ovis Poli* retire to the highest peaks and remain there all day, invariably choosing such a position that it would be impossible to approach them without being seen, and not descending until shortly before dark.

Besides *Ovis Poli* the Pamirs hold ibex and bears, but we did not care to go after them; wolves are very plentiful, and I saw one once. Hares swarm in parts.

As soon as we had had enough shooting, we started for Yarkand, going a few miles out of our way to visit Captain Gromchevsky and Dr. Conrad. It was a great pleasure to us meeting them, and we only regretted that time did not allow of our being longer together. Their intention was to go through Raskam. This we subsequently heard they succeeded in doing; but from Shahidulla they had attempted to cross the high land lying between that place and Polu, and, after suffering great hardships and losing all their ponies, they had been obliged to return.

At Tashkhurgan we got a letter from Captain Younghusband, who was coming through Raskam, asking us to halt in order to allow of his catching us up, so we stayed there for three days. While halted we had an opportunity of seeing the celebrated Turki game of boghlak, or the goat. In this game the head and feet of the carcase of a goat are cut off, and it is thrown on to the ground. The players then, who are mounted on ponies about 13 hands 1 inch in height, endeavour to pick it up without dismounting. When one succeeds he gallops off and the rest follow, endeavouring to take it from him; should one be successful, he in his turn is pursued by the others, and so on *ad infinitum*. It did not strike me as being nearly as good or as fast a game as polo. The

Turkis and Kinghiz, in spite of the fact that they are nearly always in the saddle, are very poor horsemen; the ridiculously short stirrups they use, the heel being doubled up under the thigh, prevents them from having any grip, and they come off with exceedingly little provocation. But they are wonderful hands at sitting still on a pony at a walk or gentle amble. On the longest march, even in the coldest weather, from sunrise to sunset, they will sit still like a bundle on the horse's back, without dismounting for a minute.

When Captain Younghusband joined us, which he did on the third day of our halt, riding in on a camel, having come 45 miles that morning, we halted another day to talk over our experiences, and then parted on our different roads, he going south towards the Kunjerat, and we north towards the Chichilik pass. This pass is easy enough, but on the eastern side there is a very bad bit of road. It seems ridiculous to apply the term "road" to it; but it is a road insomuch as it is the ordinary route from Tashkhurgan to Yarkand. It runs down the bed of a stream, and it is a case of continually wading through the half-frozen stream, or climbing over boulders. At one time a roadway ran over the bed of the stream, supported on beams let into the cliffs on each side, but now the only signs of what has been are the holes in which the beams rested.

Before reaching Yarkand we had two trying days. Having done a fair march one day, we reached a place where the only water to be obtained was salt, and we were told that it was at least 40 miles to fresh water. So we took the loads off the ponies and rested them till midnight, when we started again. The going, fortunately, was easy and all downhill, but it took us 13½ hours to reach water, which we did at Yakir ak Kurgan, a small spot situated in the plains amidst cultivation. As our larder was empty on getting in, I started with my gun in search of dinner, and, coming on some wild duck swimming in a canal, bagged three. Copper-smelting is carried on here, the ore being brought from a place in the hills.

On November 13 we reached Yarkand, the last part of the road having been through a rich level country cut up by innumerable irrigation canals, bordered by willow and poplar trees.

One of our first duties on arrival was to pay a visit to the amban. It was market day, and the whole city was crowded with people in their best clothes, many of whom had come in from the neighbouring villages. On every side melons, peaches, and grapes were exhibited, and, from the amount of beef and mutton displayed, I judged the people to be great meat-eaters. On arrival at the yamen, or official residence, we dismounted, three big doors resembling carriage entrances were thrown open, and we walked in. The amban seated us on high straight-backed chairs, and weak tea of a decidedly aromatic flavour was produced. He then asked us all sorts of questions, and his ignorance of geography rather took me aback; but it was my first experience of the Chinese *literati*, and I did not know how ignorant it was possible for a man arrived at years of discretion to be. Since then I have had more experience of them, and can listen with equanimity to a question that would make the most stolid caravan-driver smile. There is one question that always much puzzled me; at least a dozen times have I been asked it, and always with a feeling of uncertainty as to whether it was intended as chaff or not. It was, "Is England tributary to China?" As we left the yamen the amban saw us out, a great deal of bowing and hesitation taking place at each door as to who was to go first. He certainly treated us with both courtesy and honour, and, judged even by an Oriental standard, his manners were good. Next day he returned our visit, and drank tea with us.

Occasionally in the city we came across men with huge wooden collars on, and sometimes with one foot stuck through an enormous lump of wood bound with iron hoops; they were said to be convicted thieves, and, in answer to our inquiries, we were told that such a thing as one of them freeing himself and bolting was practically unknown. No doubt, the fact that if they did so and were recaptured they would be executed, acts as a deterrent.

One day when riding through the city I thought I saw a face amongst the crowd that I recognized. The owner caught my eye, and coming alongside my horse, said he had a letter for me which must be given in secret. I told him to follow me to our quarters; he did so, and then gave me a letter, in which I was requested to endeavour to apprehend or secure the apprehension of Dad Mahomed, the murderer of Mr. Dalgleish. Nothing was known of the murderer's whereabouts, except that he was believed to have gone east from Kashgar.

For the benefit of the reader, who may not have heard the story of the murder, I will briefly recapitulate the particulars. Mr. Dalgleish was a merchant, who for some years had traded between Yarkand and Leh. He was extremely popular amongst the natives, and had a perfect mastery of their language. The merchants especially loved him, as they found in him a just and impartial arbitrator in all their differences. The hold he had on the affections of the Turkis was wonderful, and many of them cannot speak of his death without shedding tears. Dad Mahomed was a Kakar Pathan from the neighbourhood of Quetta. At one time he had been a trader, but had become a bankrupt, and was much harassed by creditors. According to native accounts, he was much feared and dreaded all over Turkistan, and was accountable for the deaths of many men. He was over six feet in height, and powerfully built; whereas Mr. Dalgleish, though hardy and wiry, was very short and slight.

At the end of March, 1888, Dalgleish, accompanied by some

Andyani* pilgrims and Boti† servants, left Leh for Yarkand. Some distance out they were joined by Dad Mahomed, and on the fifth day after he had joined them, viz. April 8, 1888, they crossed the Karakorum pass. Dalgleish, who was ahead of the others, crossed first, and just under the crest of the pass trod down a place in the snow and pitched his tent, after which he had his tea. Just as he had finished, the rest arrived, and having taken his advice as to a suitable place, pitched theirs, and then got their tea ready. While they were drinking it, Dalgleish went to their tent. They rose up, and asked him to sit down and have some. He excused himself from drinking any tea, saying he had already had his, but sat down amongst them, and said he would take a little bit of bread to show that there was no ill feeling. The conversation then turned on Dad Mahomed's affairs, and Dalgleish advised him not to return to India at present, where he had many creditors, but to do caravan work between Yarkand and Shahidulla, and only return when he had saved enough to pay his debts. "But," he added, "it will be necessary to live quietly, and above all, restrain your love of hospitality." Dad Mahomed said, "Yes, but we have a saying that no man ever ruined himself by kindness to others." Dalgleish answered, "Yes, that is true, and kindness to others is remembered in the next world as well as in this; but still I advise you to restrain yourself." Shortly after this Dad Mahomed rose. Dalgleish asked him where he was going. He said, "I will be back directly," and went out. He then went and got his gun, and coming behind the place where Dalgleish was sitting, fired through the tent. Dalgleish, struck through the right shoulder, uttered a cry, staggered forward and endeavoured to escape to his tent where his arms were; but his assailant interposed, attacking him with a sword. Dalgleish did all that an unarmed man could do, endeavouring to close, and even seizing the sword-blade between his hands; but what could an unarmed do against an armed man? The only thing that delayed the inevitable result was the thick clothes Dalgleish had on, and the difficulty of cutting to effect through them. At last Dalgleish fell on his face in the snow, and Dad Mahomed, standing over him, continued hacking till all was still. The Botis and Andyanis, terrified, stood looking on, and did not come to the rescue, though Dalgleish's dog showed them an example, and gave them an opportunity by seizing the murderer by the leg. After the murder Dad Mahomed made Dalgleish's servant prepare a meal for him, and then quietly went to sleep on his victim's bed, first making the Andyanis swear, on what purported to be a Koran—though I believe it was not one, there not being one amongst the party—that they would not tell what they had seen. But as one of them told me, "We swore with our lips, but in our hearts we said we would." The Botis wanted to return to Leh, but the murderer made them go several marches further on, and then cut off their pigtails and told them to be off. As they retired, he fired several shots at them to quicken their movements. Separating near Killian, Dad Mahomed and the Andyanis made their way by different routes to Yarkand. There the Hindu and other merchants from British India were very much excited about the murder, and going in a body to the yamen, requested that the murderer be arrested; but the Chinese officials would not do anything, excusing themselves on the plea that neither the murderer nor his victim were Chinese subjects. After passing a few days in Yarkand, the murderer quietly continued his way to Kashgar, and although his presence there was well known, he actually having appeared before a mandarin to answer a charge of indebtedness brought against him by a Kashgarian called Mojhaidin, and although the Russian Consul, Mr. Petrovsky, repeatedly urged them to do so, the Chinese officials refused to arrest him, and he left Kashgar by the Aksu road, after which he disappeared from view.

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* Russian Mussulman subjects, inhabitants of Ferghana.

† Buddhist in Ladakhi.

When I received instructions to apprehend him, it seemed to me an impossible task. Here I was in a Mohammedan country where the people would almost to a man aid the murderer and obstruct me. There was no police to assist. Being a European and consequently conspicuous, all my movements would be known, while the murderer could pass anywhere unobserved. The whole idea appeared to me impracticable, but subsequent events showed that Captain Ramsay, with whom the idea had originated, was correct in his estimation of its feasibility. On receiving the letter, I was quite nonplussed as to how to begin. It seemed to me absolutely certain that Dad Mahomed would not give me a chance of getting near him myself; so if anything was to be done it had to be done through well-bribed natives of the country. But where were reliable natives to be found? There was not a man in the country personally known to myself, and, for all I knew to the contrary, the first man to whom I said anything would go straight off and tell the murderer. Thinking it over, I determined to consult one of the small Hindu trading community living in the city; they, I knew, would have no sympathy with a Mohammedan and a murderer. So I sent for one that seemed an intelligent man, and asked his advice. He said at once, "Consult Mahomed Yunnus, akskal of the Badakshis; he is not only a straightforward man, but he hates all Kakars and Dad Mahomed in particular." Taking the Hindu's advice, I sent for Mahomed Yunnus, who, as the Hindu had anticipated, turned out to be very keen on having the murderer arrested, and offered to lend me his brother and several more men to aid in the search. After consulting him, I started for Kashgar to find out if I could get any information there before completing my plans, while Major Cumberland left by the Marallashi road to look for stags.

On arrival at Kashgar, I found that Mr. Petrovsky was away on leave, but Mr. Lutsch, who was acting for him, gave me all the information in his power. He was, however, unable to form any conjecture as to where the murderer was likely to be, so there was nothing to do but search. One party I sent to Balkh and Mazar i Sharif to watch that country. They took with them a letter written in Persian, explaining who they were and what they were doing; but it was only to be shown to high officials, or in case of urgent necessity, such as in the event of their being arrested as spies by the Afghan authorities. Another party were to go to Samarkand and Bokhara. Mr. Lutsch kindly gave me a passport for them, and in addition I gave them a letter written in French and English, stating that they were in search of the murderer, whom they could both identify; and I hoped that, in the event of their applying to any Russian officer for assistance, they would receive it.

Having started off these parties, I set out towards Aksu by the road taken by the murderer when he left Kashgar. What I hoped was that, if he was ahead of me, he would either go into Mongolia, where an Afghan would be as conspicuous as myself, or north into Siberia, where he would probably fall into the hands of the Russians, all their outposts having descriptions of him; or, in the event of his doubling back, he would probably run up against my parties at Samarkand, Bokhara, or Balkh.

Travelling along the road was very easy and pleasant; my baggage was carried in an araba, or cart with four horses, three being harnessed as leaders, and one in the shafts, while I rode myself. The weather was bright and frosty, and we got over the ground at about five miles an hour, just double the pace a caravan in the hills usually goes at. Aksu is the only unpleasant recollection I have of that journey. There the Chinese were a terrible pest, crowding into the serai in which I halted, regularly mobbing me. At one time it seemed as if things were going to terminate in a fight; I had determined to be good-natured with them as long as possible, but at last my patience became exhausted. One of them endeavoured to bolt with the dinner my servant had brought, and put on the table for me. Hungry human nature could not stand that; seizing the dish with one hand, I struck him in the mouth with the other, the result being a yell from the mob as he landed outside. Thinking they meant to come on, I seized a carbine and took up a strategic position in the doorway; but nothing happened—they only yelled, and I, getting tired of standing, sat down. The Russian akskal of the Andyanis, who had received instructions from Mr. Lutsch to aid me in any way, was very attentive, and assisted me in making purchases, etc. From Aksu I continued my journey east to Kuchar, a town of much the same character, and containing the same obnoxious Chinese and pleasant Turkis. About this region one also begins to meet with Tunganis, a race of Mussulman Chinese. Their physique is much superior to that of other Chinese, probably owing to their being less dissipated and abstaining from drugs. In their manners they show a certain amount of Oriental dignity and courtesy, and none of the childish insolence of the Chinese. At Kuchar I happened to hear of a man answering to the description of Dan Mahomed, who lived further east, so I sent a man to see if it really was he. Word was to be brought to me in the jungles south of the road, whence I could have dropped down suddenly and unexpectedly at any point on the main road.

Having sent this man off, I discharged the araba, engaging five ponies as transport in its place, and then started for Shahyar, two days' march distant. But we had not gone five miles before one of the ponies dropped dead, presumedly from heart-disease; this occasioned a day's delay, as another had to be procured in its stead. Shahyar, which was reached by a double march, is a scattered village situated in a belt of cultivation running into the jungle country. Here, on arrival, I found Major Cumberland, who had come from Aksu by a southern route, keeping close to the river. We spent a couple of days together, and then parted, he going north to Yulduz, while I started west through a seemingly endless plain covered with tall feathery grass (*Phragmites communis*) and patches of spreading poplar (*Populus Euphratica*), and cut up by winding rivers. The inhabitants are extremely few in number, and consist of shepherds living in isolated huts scattered along the banks of the rivers, and having in their charge enormous herds of sheep. At one station there were said to be ten thousand sheep all owned by one man. These shepherds are an extremely nice, simple, hospitable people. On my arrival at their huts, they would run out and take my horse; then usher me in, and, spreading a felt in front of the fire, invite me to be seated while they got tea ready. At night I had difficulty in preventing them from giving up their huts entirely to me and sleeping in the open, a sacrifice that, considering that the thermometer went below zero, one would hardly expect them to wish to make.

In summer the inhabitants of the Kuchar and Bugur districts take their flocks up into the mountains lying to the north, firing the grass before leaving, but the people in the Lob district remain down all the year round. These Lob people appear to be in a much more backward state than their neighbours; their houses are simply rough shelters made from long grass, and they live almost entirely on fish caught in the rivers and small lakes with which the district abounds. The Chinese never visit the country, but I heard a rumour that they intended to establish a station there for the collection of taxes.

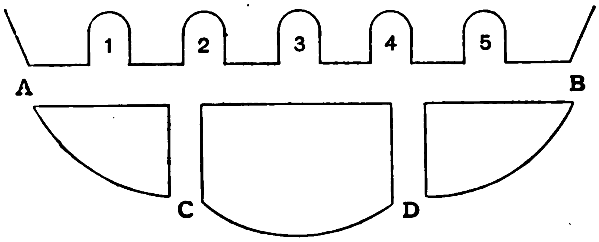
As regards the game to be found in the district, tigers are fairly numerous, but I never saw the tracks of a leopard, nor could the inhabitants give me any information as to their being such an animal. Stags are found, but are extremely hard to shoot, owing to the thick jungle. As a rule, when travelling through the thick tall grass, all one sees is the tops of their antlers as they gallop off when disturbed, and getting one must always be a pure matter of chance. This stag has been often called the maral stag, but the word is misapplied, maral being simply the Turki for "hind." The stag is called bogha. Travelling east, the teran, or gazelle, becomes scarcer, evidently preferring a more open country. At the southern edge of this strip of jungle-covered country wild camels are found; they have two humps, and are smaller than tame ones. At all times they are hard to bring to book, as they wander about a great deal, and the best chance is to watch a place where they come to drink; but when snow is on the ground they don't require to drink, but simply slake their thirst by eating it. At that time it is almost a hopeless task looking for them. Wild pig are met with, but I only remember seeing one sounder, so they cannot be very numerous. Of smaller animals hares, foxes, and wild cats seem to be the chief representatives. The commonest game bird is the pheasant (*Shawii*), but to shoot it it is necessary to have a dog; without one it might be possible to travel for weeks and never discover that there was a pheasant in the country. The partridge (*Perdrix barbutus*) is found round the edges of any scattered patches of cultivation, and is a noble bird rising freely, quite unlike his Indian cousin, the grey partridge.

On the north of the Charan river a blight seems to have fallen on the country. The greater part of the land is absolutely without grass; dead trees lay strewn about, and some are standing perfectly dry and withered up, but perfect even to the smallest twig. A weird bit of country with one redeeming point about it—the dead trees make grand camp fires, and one has not even the trouble of cutting them down. The two lakes Shari Kumosh and Raba Kul, that are marked on all our maps, puzzled me completely. No one in the country had ever heard of them, and my route went right across the place where one of them was marked, but no lake did I see. The Yangi Darya, or New River, is said only to have existed for ten years.

As nothing had been heard of the man answering to the description of Dad Mahomed from Bugur, I returned to Kuchar by the main road running at the foot of the Tian Shan mountains, whose snowy peaks could be seen rising up above the haze that seems ever present in Turkistan. At Kuchar, where I halted for several days, a Turki who had been in India used to come and sit with me in my room in the strai. One day in conversation he told me about an ancient city he knew of built underground in the desert. I thought at first that he meant one of the ordinary buried cities of the Gobi Desert; but he insisted that it was something quite different, and explained that it was underground by the wish of the people that made it, not by reason of a sandstorm. He told me, also, that he and one of his friends had gone there and dug for buried treasure, but had found nothing except a book. I asked to see it, and, going away, he returned in about an hour, bringing some sheets of birch bark covered with writing in a Sanscritic character and held together by two boards. I bought them from him, and it was fortunate I did so, as they have since excited a considerable amount of interest in the learned world; they are believed, by those best qualified to judge, to be the most ancient Asiatic manuscripts in existence. When I asked him to take me to this interesting place, he demurred a good deal on the ground that the people would kill him if he took a European there; but at last he consented on condition that we went at night, so as not to be seen. This I readily agreed to do, and, starting at midnight, we marched steadily forward in a westerly direction. When daylight broke we had left cultivation far behind, and were on the shoulders of a range of low gravelly hills, and away to the south a narrow strip of green with houses at intervals marked the course of a canal.

Keeping on, we came to the curious old erection from under which the manuscript had been unearthed. Similar erections are found in different parts of Chinese Turkistan, several in the Kuchar district, and one on the north bank of the river at Kashgar. They are solid and built of sun-dried bricks and wooden beams, now crumbling away. In shape they roughly resemble a gigantic cottage loaf about 50 feet high. Judging from the weather-beaten appearance they present, and taking into consideration the fact that the snow and rainfall in these parts is almost nominal, it is very evident that they must be of great antiquity. The natives attribute them to King Afrasiab, but as a general rule everything ancient is attributed by the Turkis to that monarch, who flourished about 580 B.C. Close by on the banks of a river were the remains of the ancient underground city of Mingoi, to which my guide had promised to take me. Crossing the river on the ice, I was able to have a good view of the hills that had been tunnelled to make the city. These hills appear to have been much worn away by the action of the river. High upon the face of the cliffs overlooking the water the marks of what have been habitations are to be seen, portions of the tunnelled hills having been worn away in such a manner as to show sections.

Returning across the river, I entered one of the tunnels. It was shaped as under—



AB represents a tunnel 60 yards long by 4 broad through a tongue-shaped hill. C and D are the entrances, the hill being almost perpendicular at A and B. 1, 2, 3, 4, 5, are cells. The walls have been plastered, and what appears to be the remains of geometrical patterns could be made out. According to the natives, many similar dwellings are found in the neighbourhood.

From this place we went to Faizabad, and, having spent the night there, next day marched down the banks of a canal to Charshamba; the whole way it was like one continued farm. As the canal was free of ice, numbers of wild duck were collected in it, and I shot thirteen, mostly pintails; had I cared to do so, there would have been no difficulty in shooting very many more.

On my return to Shahyar I heard that a native had killed a tiger in a pitfall, and I asked if I might see the skin; but the owner refused, fearing that I might take it from him by force, in which case he would be punished by the amban at Kuchar, who expected to receive all valuable skins of animals killed in the district. The Turkis are quite childish in their timidity.

Leaving Shahyar on March 6, I crossed the river on the ice. It was rather dangerous work, as the ice was beginning to break up, and the day previous a man and a bullock had been drowned. However, we got safely over, but next day it would have been too late, and the only thing to do would have been to wait for a week, and then cross in a boat. It is only about 100 yards wide, but very deep.

The country on the south bank is of much the same character as east of Shahyar—forest and tall grass with shepherds' stations scattered about. South of one of these stations are the remains of the ancient city of Shahr-i-Khuttuk, now buried in the sands of the desert. The neighbourhood is considered a good place to find wild camels. The natives have all sorts of extraordinary stories about the desert. In it there are supposed to be houses with golden doors, guarded by spirits, who would punish any one bold enough to approach. A daring man from Khoten, whose cupidity was excited, gathering some kindred spirits together, undeterred by warnings, resolved to penetrate; but after going a certain distance, all the party, with the exception of one who guided them back, were struck with blindness. Since then no one has endeavoured to penetrate the mysteries of that unknown land.

At the ferry of Khoten-Khemer we recrossed the river, which is 100 yards wide, 12 feet deep, and has a current of 2·6 miles an hour. The country on the road to Matan, near which there are more buried ruins, is of a much poorer character than south of the river; the tall grass jungle, interspersed with forest, being replaced by a poor scrub.

At Matan we crossed the Aksu river by a ferry, and entered the well-cultivated district of Anat, much cut up by irrigation canals. Thence through a forest country, with but little grass, to Yaka Kuduk on the main road, and back to Kashgar, which was reached on April 1, when signs of spring were to be seen on every side. The coldest temperature that had been registered at the consulate was zero; the greatest cold I had experienced was in the neighbourhood of Aksu, where the thermometer went down to $-10\frac{1}{2}°$ Fahr. Shortly after my arrival at Kashgar, a messenger arrived from Samarkand with news of the apprehension of the murderer. He had been seen in the bazaar by the two men I had sent there. One remained to watch him, while the other went off with my letter to the governor, who on reading it promptly sent out a party to secure the murderer. I feel much indebted to the governor for the kind and prompt way in which he acceded to the request contained in my letter.

Possibly no country in the world has a history which is such a long succession of stories of invasions and struggles for the mastery between different peoples as Kashgaria. These peoples or nations, from the Scythians down to the Chinese, have in many cases differed enormously in race, the result being that at the present day, in the bazaar at Kashgar, amongst the natives every type of face may be seen, from the typical Mongol to the typical Aryan.

While I had been following Dad Mahomed's tracks, I received intimation that Amir Mahomed, brother of Dad Mahomed, had come from India, and was following me; so I put a man on to follow him. Thus the whole thing turned into a sort of procession. Now that Dad Mahomed had been caught, Amir Mahomed felt it incumbent on him to do something to avenge his brother. My servants got terribly frightened, as whenever they went into the bazaar they were threatened by the murderer's compatriots. On one occasion my Kashmiri cook returned much agitated, and said a Pathan had told him in the town, "You and your master are very proud of yourselves just now; but it is a long way back to India, and you are not safe there yet." On one occasion, happening to be awake in the night, I saw a man in the moonlight climb over the wall into the garden I was sleeping in. I jumped up, and seizing a carbine, tried to get a sight on him; but he slunk back into the shade, and I could not make him out. After I had waited for what seemed an age in hopes that he would show himself, he suddenly made a rush, jumped a wall, and disappeared from view.

A few days later Amir Mahomed had his throat cut, a matter of great satisfaction to me. After that I felt no anxiety, believing as I did that he was the only man in the country who would probably attempt to assassinate any of my servants or myself.

On June 13 I received information from Mr. Lutsch that the murderer whose extradition I had been awaiting had committed suicide, so there was nothing for me to do but to return to India, which I did at once, reaching Simla on August 16.

THE FALLS OF THE TSANG-PO (SAN-PU), AND IDENTITY OF THAT RIVER WITH THE BRAHMAPUTRA.

By Surgeon-Major L. A. WADDELL.

NONE of the trained Indian surveyors, so far as I remember, have yet penetrated to the falls of the great Tsang-po river, in the lower part of its course through Tibet; but by hearsay reports these falls have been placed about 29° 36′ N. lat. and 94° 171′ E. long., between the districts of Kong-bu and Pema-koi.[*] Under such circumstances the attached sketch by a Lama artist, who is a native of the last-named district, and who knows the place well, may be interesting; especially as all those Tibetans who have visited the fall, to whom I showed the sketch, recognized the general correctness of its leading features.

For several miles above the falls, the river runs, as already known, in a narrow precipitous defile along which no path is practicable. The falls can only be approached from below the gorge, where, as they form a place of pilgrimage, a rude monastery is located. Their height is estimated at about 70 feet, and they are enveloped, as shown in the picture, by clouds of mist and spray, and the cliffs are covered by subtropical vegetation, and tiger lurk in the neighbourhood.

The local Lamas relate to the awestruck pilgrims that amid the thundering water stands a king-devil of the T'ag-po type, as described and figured by me in my recent book on 'The Buddhism of Tibet,' and hence the place is called "T'ag-po." This devil is placed there under a spell by the Lamas, and when the river is low, the faithful can see his figure looming dimly through the falling waters, as indicated in the picture.

As regards the still unsettled question of the identity of the Tibetan Tsang-po with the Brahmaputra, I have seen no reference, in the bulky publications on the subject, to the evidence afforded by etymology. Now, it is interesting to note that the Tibetan word *Ts'ang-pu* is the literal equivalent of the Sanskrit *Brahmaputra*, and means "the son of Brahma." And a curious Tibetan legend associates Brahmaputra with the Tsang-po river near Lhasa. The legend relates how the son of Thi-srong-deu-tsan,[†] who reigned about 750 A.D., was drowned in the river, and the king ordered that the river at that spot should receive a certain number of lashes daily, as a punishment for its crime. After a time the spirit of the river, unable to endure any longer such an unjust punishment, appeared before the king *in the form of Brahmaputra*, and besought the king to cast a piece of wood into the river. On this being done, the wood was immediately carried off down stream. In this way the river-spirit showed that the water which drowned the prince had long since passed on, and that the water now at the spot was wholly innocent of the offence for which it was being whipped.

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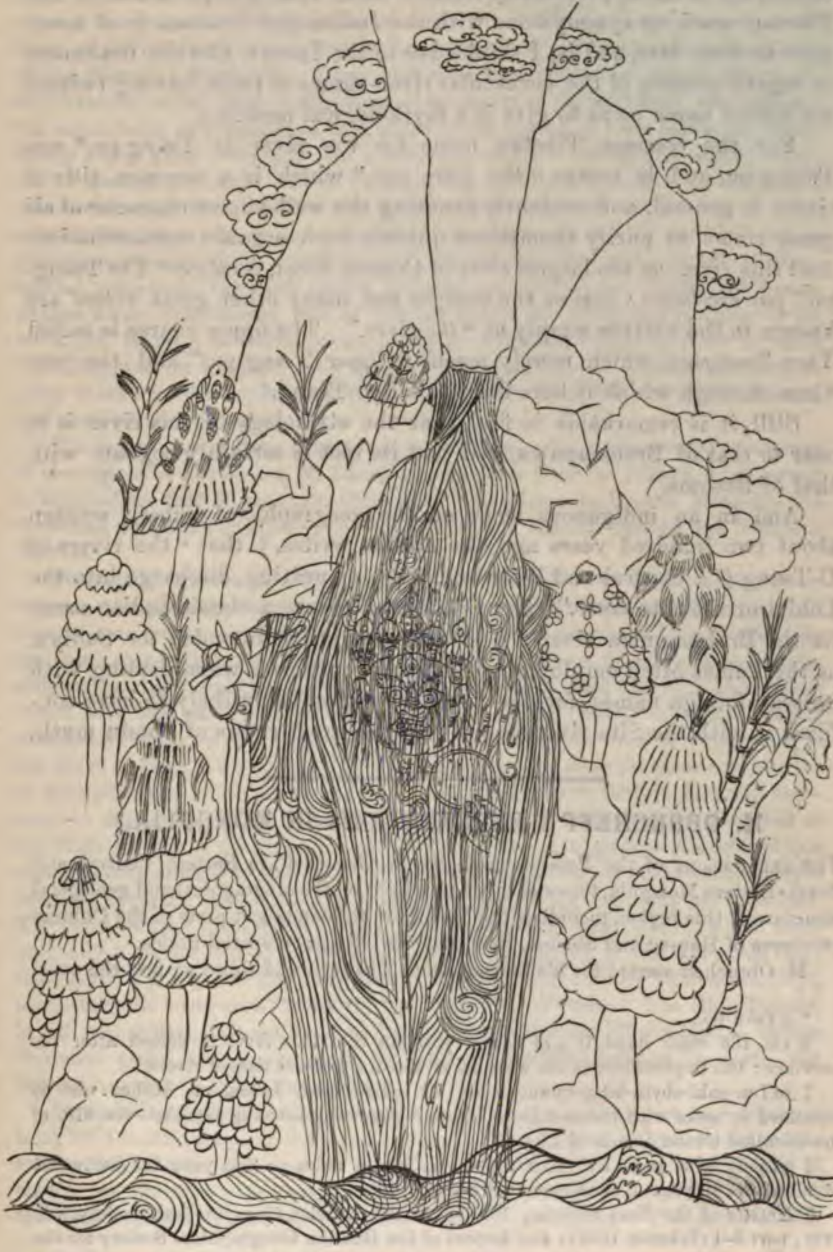
[*] See *General Report*, Survey of India Department for 1886–87, Appendix, p. xxix. Pema-koi (Padma-kod) is strictly a fiscal subdivision of Kong-bu district.

[†] Spelt Khri-srong-deu-tsan.



FALLS OF THE TSANG-PO (SAN-PU).
(*From a native Tibetan drawing.*)

But as Hindu mythological names, such as Brahma, were unknown to the Tibetans before the reign of Srong-tsan-gam-po in the seventh century, A.D., it is practically certain that this interpretation of the Tibetan word, as synonymous with the Indian god Brahma, is of much more modern date, and is, I think, due to the Lamas, like the Brahmans in regard to many of the vernacular river-names of India, having twisted the native name so as to give it a mythological meaning.

For the common Tibetan name for the river is Tsang-po,* not Ts'ang-pu, and it means "the pure one," which is a common title of rivers in general, and evidently denoting the well-known character of all great rivers to purify themselves quickly from organic contamination. And this river, as the largest river of Central Tibet, is called "*The* Tsang-po" *par excellence;* just as the Ganges and many other great rivers are known to the natives simply as "*the* river." The upper course is called Yaru-Tsang-po, which merely means "*Upper* Tsang-po," and the province through which it here flows is called Tsang.†

Still, it is remarkable to find that the etymology of this river is so near to that of Brahmaputra, and that its root is certainly cognate with that of Brahma.

And in an indigenous work on the geography of Tibet,‡ written about two hundred years ago, the author writes, § that "the rivers of U-Tsang (*i.e.* Central and Western Tibet), on uniting, discharge into the Lohita or the Sita river." The *Lohita* is, of course, a classic Indian name for the Brahmaputra river. The *Sita* possibly is intended for Sadiya, as the Lamas often employ notoriously corrupt forms when dealing with hearsay foreign names, for the Lamaist author is unlikely to have confused it with the Sita river, one of the four great rivers of Hindu myth.

M. OBRUCHEFF'S EXPLORATIONS IN MONGOLIA.‖

The explorations of the Russian geologist, M. Obrucheff, in Eastern, Central, and South-Eastern Mongolia, throw so much new light on the orographical and geological structure of this region, including the Nan-shan highlands and parts of the Chinese provinces of Han-su and Shen-si, that they well deserve a special notice.

M. Obrucheff started for his journey from Kyakhta, and followed first the usual route to Pekin. Thence he rapidly crossed the distance to Thai-yuan-fu, already explored by Richthofen, and therefrom he began his most interesting explorations. From this Chinese city, situated in about 37° 55′ N. lat. and 82° 15′ E. long., he went westwards, crossing South Ordos to Nin-sya, on the left bank of the Yellow river at the foot of the Ala-shan mountains. From Nin-sya he journeyed south-west, on the left bank of the river, to Lan-chau-fu, at the south-eastern extremity of the Nan-shan highlands. These highlands were crossed in several directions, and Su-chau, at the other (north-western) extremity of the highlands, was reached; the result being an orographical map of the whole system of these highlands, which finally brings some order into the bewildering chaos of mountains usually represented there on our maps. From Su-chau, the traveller's intention was to proceed eastwards, across the Ala-shan and Ordos plateaus; but he had the chance, if we are permitted to say so, to find no guides for that journey, and he was compelled to proceed north-east, down the Edzin-gol, and, further still, as far as the Gurban-saikhat mountains (the south-eastern extremity of the Eastern Altai), and thus to explore a very little-known part of Central Mongolia. After having gone so far north (43° N. lat.), he had evidently to return south-south-east in order to reach Boro-Balgasun (or Bolgisun), and thence back to Su-chau, wherefrom he now proposes to start for the exploration of the central Nan-shan, the Eastern Tian-shan, and the Toksun depression.

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* gTsaṅ-po.

† On the other hand, it is of course possible that this river is named after the province; but improbable, as the word is, as noted, a general title of rivers.

‡ bsTon-pahi-sbyin-bdag-byung-ts'ub, by gLong-rdol Lama, an author who is identified by some with the first Dalai Lama Ngag-wang Lô-zang-Gyat'so—the fifth of the so-called Grand Lamas of Lhasa.

§ gTsang bdus gnyis kyi chhu 'dres-pa la Lohita chhu-po Sita yang zer (extracted from chapter ii. page 5, of above-noted book).

‖ *Isvestia* of the East Siberian Branch of the Russian Geographical Society, vol. xxiv, part 3–4 (Irkutsk 1893); the Report of the Russian Geographical Society for the year 1893, pp. 12 *seq.;* and *Izvestia* of the Russian Geographical Society, vol. xxx. 1–4 (St. Petersburg, 1894).

The importance of these journeys is self-evident. As to the general characters of the regions he has visited, M. Obrucheff describes them as follows, after having subdivided the field of his explorations into East Mongolia, Central Mongolia, the Nan-shan highlands, the Ordos, and the plateau of Eastern Han-su and Northern Shen-si.

The region between Kyakhta and Urga is described as an intermediate region between the periphery parts of Asia which have an outflow into the ocean, and Central Asia proper, which has no such outflow. Having emerged from beneath the sea much sooner than the latter, it has had time to undergo for a long time denudation by the rivers, and therefore the plateau has been divided into hills and valleys which have been excavated before the setting in of the present dry period, during which the valleys further south have been filled with loess. We have, therefore, in the north of Urga, a highland with a dominating type of what the Germans describe as *Rumpfgebirge*. [It may be added to that characteristic that, in fact, the highlands in the north of Urga belong to what the writer of these lines has described as the High Terrace of the Great Plateau of East Asia. The plateau character of this region is only masked to the traveller by the deep excavations of the valleys, but it becomes apparent when the altitudes east and west of the high-road are consulted. The usual caravan route follows here a sort of deep and broad trench, which leads gradually from the level of the Selenga to the water-parting of the Gabyn-da Can; this chain, continued further north-east by the steep slopes of the Yablonovoi ridge, constitutes the south-eastern border-ridge of the High Terrace.* The High Terrace, in all probability, has not been under the sea since the Carboniferous or the Devonian period, and it consists of crystalline unstratified rocks in the north, and crystalline slates in its southern part.]

Beyond Urga begins the lower terrace of the plateau, which has an altitude of from 3000 to 3300 feet, and is fringed, in the neighbourhood of Kalgan, by the south-eastern border-ridge. The whole represents, in Obrucheff's opinion, a plateau of marine denudation, and is covered with rough sand and gravel, but nowhere with the loess deposits which Richthofen has seen in North China. The rocks consist chiefly of crystalline schists and slates, probably older than the Sinian formation, and partly of unstratified crystalline rocks. Sheets of basalts, which probably have flown after the disappearance of the sea, cover them in some places. As to more recent formations, they are found at Baga-ude, and seem to belong to the Cretaceous; while still more recent deposits, not older than Tertiary, cover the flat heights where they have resisted denudation. After the disappearance of the interior Khan-khai sea, the present dry period began, and the finer loam of the superficial deposits has been carried away by the wind, while the heavier pebbles remain and now cover the surface of the steppe. Sandy spaces are very limited.

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* "General Sketch of the Orography of East Siberia," in *Memoirs* of the Geographical Society, General Geography, vol. v.

The eastern Gobi is often supposed to be a desert, but M. Obrucheff shows that this is not true. Eastern Mongolia has its rains, which sometimes last in the summer for two and three days in succession, and it has some snow in the winter. Therefore it is covered after the rains with patches of grass which dries up as the summer advances, but provides the camels and even the horses of the numerous tea-caravans with necessary food. Only the central depression is bare, while the remainder deserves the name of a steppe, but certainly not that of a desert. It is widely different from the deserts of the Tarim or of the Alashan.

Going now over to the Nan-shan highlands, we must abandon the idea of following M. Obrucheff in the description of his journeys in this mountain region, during which journeys he met with Mr. and Mrs. Littledale, who had crossed the western part of the highlands. Sufficient to say that the Russian geologist has crossed the whole system three times at its south-eastern end, and once at its north-western end. As to the middle parts, they have been crossed in parts by Potanin and by the brothers Grum-Grjimailo. On a small sketch-map made at Su-chau, and printed in the *Izvestia* (1894), M. Obrucheff gives the positions and the directions of the different ranges, which all run roughly parallel to each other, north-west to south-east, attaining heights up to 20,000 feet, and are snow-clad in parts, while high valleys separate them from each other. On this map an attempt is being made to connect the chief ranges of the north-western Nan-shan with those crossed in the south-east; but, on account of a want of exploration of the middle parts of the highlands, much remains hypothetical in this attempt. It may be hoped, however, that, on the ground of his detailed explorations, which he intends to continue in the central highlands as well, M. Obrucheff, helping himself with Potanin's, Grum-Grjimailos', and Littledale's surveys, will be able to give us on his return a full orographical sketch of the whole region.

In the mean time, it is well to notice his remarks relative to its leading features. As regards the name of Nan-shan ("Southern Mountains" of the Chinese), he very justly proposes to maintain it for the whole system, and to designate each of the separate ridges by a special name. Following Prjevalsky, who already has named two of the ridges of the north-western part by the names of Humboldt and Ritter, he proposes the name of Richthofen's Range for the outer north-eastern ridge of the highlands which has at its north-east foot the series of oases running from Su-chou to Han-chau and Lyan-chau (not to be confounded with Lan-chau, situated 150 miles south-south-east on the Yellow river). The second great range would be Humboldt's; it is continued south-eastwards either in the Maling-shan, or in the Tsing-shi-lin. The third range would be Ritter's; and for the fourth and the fifth the names of Mushketoff's and Semenoff's Ridges are proposed. The south-eastern continuations are evidently pierced through by the Yellow river, when it takes below Lan-chou a north-eastern direction.

Without translating the whole of the paper of M. Obrucheff on the Nan-Shan, it would not be possible to give here his many remarks relative to the characters and heights of the many separate ridges and the longitudinal valleys which separate them. Still less would it be possible to reproduce here the mass of information relative to the geology of the Nan-shan system, which the explorer had such splendid opportunities to study during his four journeys across its whole width, and which he gives with many details.

The fossils found in a widely spread series of coal-bearing deposits will permit geologists to determine their age with exactitude, and no doubt the geological history of the region, now sketched in that paper, will appear with more completeness in later reports.

As to the other regions described by M. Obrucheff in a subsequent communication written at Hoi-syan in January last year,* we may begin with Central Mongolia. This region (which comprises the space covered in the journey from Su-chau northwards, and back to the Yellow river) is intersected by many chains of mountains and hills, always having the direction of either west-north-west or north-east. They are separated from each other by broad depressions, having the characters of either longitudinal valleys or flat depressions, enclosed on all sides by mountains. The altitudes of the depressions vary from 3400 and 3700 feet in the south, and attain nearly 5500 feet towards the South Altai, while the mountain ranges seldom rise more than 2700 to 3300 feet above the depressions, thus reaching altitudes of not more than 8200 feet. We thus have in Central Mongolia a characteristic plateau from 3000 to 4000 feet high in the south, and 5000 feet in the north, with mountains rising about 3000 feet above its surface.

A characteristic feature of the ridges of Central Mongolia (also of East Mongolia and North-Western Nan-shan) is, that they all stand on broad pedestals which sometimes reach one-half or two-thirds of their relative heights above the depressions. These pedestals have soft, smooth outlines, while what rises above them is always rocky and divided into broken, ragged peaks. This feature (whatever its cause may be) is general, but in some ridges it is especially well pronounced.

Like Eastern Mongolia, Central Mongolia, even in its worst part, the Golbin Gobi, has not the characters of a desert; it is a steppe covered with grass and bushes, and both camel and sheep find food everywhere; very often, too, the horse. Only the territory in the west of the Edzin-gol is a desert in the true sense of the word.

"Central Mongolia," M. Obrucheff writes, "completely deceived my expectations, just as was the case last year with East Mongolia. Instead of the sand deserts of our maps, I found broad ridges and rocky hills, mostly very low and much disintegrated, but certainly not sandy plains. There is very little sand indeed, and the loess, contrary to Richthofen's opinion, is wanting here as well. Broad valleys and shallow depressions occupy the spaces between the ridges, and everywhere there is vegetation. It is not a desert, but a steppe, and the poorest parts of the Golbin Gobi are oases in comparison with the true deserts of the left banks of the Edzin-gol. The Mongols of the Southern Altai told me that my two horses would not be able to cross the Golbin Gobi, as there is no grass at all, and they advised me to leave the horses with them—probably expecting to have them for themselves. But my horses have brought us quite well to San-to-kho, and though for the last couple of miles it was I who dragged the horse, and not the horse which carried me, the fault of it was not with the Golbin Gobi, but with the long journey with very few days of rest, and the long marches upon very little food; and then, the horses were not first rate creatures, and had been overworked in the Nan-shan."

The Ordos has a quite different character. In its western division, which has been visited by M. Obrucheff, a northern and a southern part must be distinguished. In the former, the plateau is covered with flat hills going in different directions, and rising but from 660 to 1300 feet above its surface. They consist of soft sandstones, mostly horizontal, which are covered, especially in the neighbourhood of the Yellow river, by low hills and *barkhans* (low *dunes*) of sand. The southern part down to the southern frontier of the Ordos, consists chiefly of sandy *barkhans*, with more or less wide flat depressions between them, which the Mongols name *chaidams*. These are often bottoms of dried-up salt or fresh water lakes. Similar sands cover the low left bank of the Yellow river as far north as the Khana-naryn-ula ridge, which already belongs to Central Mongolia.

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* *Izvestia* of the Russian Geographical Society, 1894, 2.

In the south of the sandy regions of South Ordos the country rises higher, and there begins the loess plateau of the Eastern Han-su and Northern Shen-si. On looking upon it from the plains of the Ordos, it has the aspect of a flat swelling, 1000 to 1300 feet of relative height, divided by ravines into separate parts, named "mountains" by the natives. Even on our maps, a range, Lu-guan-lin, or Bo-yui-shan, is marked; but in reality it does not exist. While crossing the region from east to west, and again from north to south, M. Obrucheff saw no range, and only found a loess plateau, divided by a labyrinth of ravines into a number of table-topped hills, all of nearly equal height. The slopes of the ravines show loess, which covers the same soft sandstones as in the Ordos. This ravined plateau has a width of about 130 miles, from the Ordos plains to the neighbourhoods of Tsin-yan-fu. Its northern part is very difficult to travel upon, on account of the ravines which one has continually to cross. In its middle, from Tsin-yan-fu to about Lin-tai, the plateau is less ravined, and is divided into table-like masses 7 to 27 miles wide. The road crosses for hours a plain covered with cornfields and villages, and then, all on a sudden, one sees a wide river-valley, cut in 1000 to 1300 feet deep into the plateau. The immense amphitheatres thus formed have their slopes in numerous small loess terraces, each of which is about 15 to 20 feet high.

The passage from the northern to the middle part of this plateau is gradual; but not so from the middle to the southern part, which may have a width of about 50 miles. Again one meets here the same countless ravines, but some order is seen in their orientation from north-west to south-east. Two ranges, separated by the valley of the Tsin-yai-shin river, may be distinguished, and from beneath the loess one sees the rocks *in situ*, which rise to the height of the plateau, and are covered on their tops with but a thin sheet of loess.

The altitudes above the sea-level are—3180 feet at San-to-kho, wherefrom the level gradually rises from the Yellow river to 4900 to 5000 feet, for the flat heights of North Ordos, and 4300 to 4600 feet for South Ordos (Borobalgasun, 4340 feet). The highest mountains attain 5900 feet in the north and 5400 feet in the south. The pass across the Lun-fon-shan range is 4430 feet, and across the Se-thu-shan 3690 feet.

As to the geological remarks of M. Obrucheff relative to the above three regions, they are in substance the following. The plateau of Central Mongolia consists of crystalline non-stratified rocks (granites, diorites, etc.), in the distribution of which the directions west-north-west to east-south-east, and west-south-west to east-north-east, prevail, partly also north-north-west and north-north-east. Crystalline shists (gneisses, mica-shists, quartzites, etc.) and half-crystalline deposits (metamorphosed sandstones and limestones), probably of Archæan formations, cover immense spaces, and they are covered in places by Carboniferous deposits, as well as occasionally by rocks of volcanic origin. The above formations make the backbone of the Mongolian plateau, which received its full configuration after the Carboniferous period. Depressions in it were covered next by the Khan-khai sea, which probably gave the above-mentioned characters to the mountains (broad pedestals and cliffs above them). This sea covered large areas, but it did not extend over West Ordos, which must have stood above its level in the shape of a wide island or peninsula. In the explored parts of the Han-su and Shen-si provinces, limestones, probably Silurian, are seen, and they are covered with post-Carboniferous horizontal deposits. These latter are covered in their turn with a sheet of unstratified clay, attaining the thickness of from 240 to 300 feet, which is covered in its turn with loess.

The above gives, however, but a very faint idea of the extremely valuable observations of which M. Obrucheff's reports are full. If we do not sum them up with more fulness, it is only because we expect the explorer will give us a still more complete and authoritative geographical and geological description of the whole region.

In a letter dated Lan-chau, March 29, 1894, and published in the last issue of the St. Petersburg *Izvestia* (1894, iv.), M. Obrucheff gives a short account of his journey across the Tsing-ling-shan, or Eastern Kuen-lun, to the basin of the Se-chuan river. Although the journey was accomplished during the best part of the year—that is, towards the end of the winter and at the beginning of the spring—the Russian explorer describes it as the most unpleasant part of all his travels. Neither the picturesque mountains, rocks, and gorges, nor the rich southern vegetation of fan-palms, bamboos, and other sub-tropical plants, can sufficiently reward the traveller for the bad roads, the clouded sky, and the discomfort of nights spent in dirty Chinese hotels amidst an obsequious population. He was happy to return once more to the less brilliant, cold, and dusty nature of the north.

On his way from Lan-chau to Guan-yuan, *viâ* Fin-syan, Khoi-syan, and Lu-yan, M. Obrucheff partly followed the route of Richthofen; but on his back journey to Lan-chau he crossed the Eastern Kuen-lun further west, passing through the towns of Tse-chau and Min-chau, and thus touching in some places the route followed by Potanin. The geological data collected during the southward journey fully confirm Richthofen's generalizations; M. Obrucheff only remarks that he found, amidst the older deposits, in the neighbourhood of the towns Khoi-syan and Lyan-dan, wide, nearly horizontal deposits of Mesozoic and, perhaps also, Kainozoic age, very similar to the Khan-khai Sea deposits, which show that the sea deeply penetrated at that time into the valleys of the Eastern Kuen-lun. The Ta-lyang-shan ridge, in the south of Khoi-syan, represents the southern limit of the Loess.

As to the part of the Kuen-lun which was visited during the back journey *viâ* Tse-chau, its orographical structure is similar to what Richthofen saw further East. The chains and valleys are due to a mighty erosion; there are no "tectonic" longitudinal valleys, and the rivers flow in transversal valleys, eroded across the ridges. The Archæan granites and gneisses and the mighty U-tai formation are missing; but Cambrian or Lower Silurian deposits are widely developed. So also representatives of nearly all subsequent formations, up to the Tertiary deposits of the Khan-khai Sea and the Loess. The latter appears sporadically in the north of Pi-shan; but the Ling-yang-shan ridge may be taken as the southern limit of the mass deposits of the Loess.

Great dislocations in the directions W.N.W. to E.S.E. in the northern part of the region, and W.S.W. to E.N.E. in its southern part, have built up this system of highlands, and the dislocations have lasted, gradually diminishing in intensity, since the formation of the coal-bearing parts of the Carboniferous system till after the retreat of the Khan-khai Sea.

Since the above letter was written, M. Obrucheff has returned, *viâ* Kulja, to St. Petersburg, and he has delivered before the Russian Geographical Society a lecture on his journeys. Only a very brief report of this interesting communication has hitherto been published in the papers.

PHYSICAL GEOGRAPHY AT THE VIENNA CONGRESS.

As already mentioned in the Monthly Record, the geographical section of the Science Congress at Vienna last September was, during part of its sittings, divided into a number of sub-sections, one of which concerned itself exclusively with physical geography and oceanography. Special efforts were made by Professor Penck to obtain a programme for this latter which should be thoroughly representative of recent work in all departments of the subject. At a sitting devoted to the new science of limnology, the work of Dr. H. R. Mill in the Clyde sea-area and in the English lakes was discussed, and M. A. Delebecque's atlas of the French lakes exhibited. Dr. J. Müllner (Gratz) described the atlas of the Austrian lakes, of which the first part, including the lakes of the Salzkammergut, is ready for publication. The second part is in preparation, under the editorship of Professor Penck and Dr. E. Richter, and will deal exhaustively with the Carinthian lakes and the northern part of the Lake of Garda. In this connection, Dr. Richter read a communication on his soundings and temperature observations in the Austrian part of Lake Garda. Over 120 soundings have been made, a relatively much larger number than has been made by the Italians, who have only 400 in an area twenty times as great. The greatest depth in the Austrian section is 170 fathoms against 189 fathoms in the Italian; the relief of the basin is extremely simple, the banks sloping steeply down to a point where the bottom forms a comparatively level plain. The channel of the Sarca is only indicated by a sublacustrine bar, in strong contrast to the well-marked course of the Rhine through the Lake of Constance, and of the Rhone through the Lake of Geneva. The distribution of temperature is remarkable, as appears from the following—

Depth (fathoms)	0	11	16	27	55	144 to 170
Temperature (Fahr.)	66·2	65·1	55·8	50·0	46·0	45·9

which discloses the presence of a "transition layer" (*Sprungschicht*) between 11 and 16 fathoms, with a sudden drop in temperature of 9·3° Fahr. The 45·9° Fahr. reading is the highest bottom temperature yet observed in a European lake.

An interesting account was given of Mr. L. von Loćzy's (Budapest) work for the Hungarian Geographical Society in the Balaton lake, which has taken the form of a complete hydrographic survey, including soundings and measurement of surface levels. So far as the work has gone, the results show that the southern part of the lake is very shallow; the banks go down steeply to a depth of about 5 feet close to the shore, and in the middle of the lake the depth is barely 2 feet greater. The maximum depth—35 feet—is found near the Tihany peninsula on the north-western side, in the narrowest part of the lake, and in this strait the wind produces a current which sometimes attains a velocity of 1¾ to 2 miles an hour. Evidence of the occurrence of "seiches" — waves due to differences of barometric pressure at the two ends of the lake—has also been obtained, and their period has been estimated at 43 minutes. A network of meteorological stations round the Balaton lake provides data for investigating, in the first place, the nature and amount of its water-supply, and both in the wide steppe region to the south and the hilly country to the north phenological observations are being made with the view of ascertaining what influence the lake has on the districts surrounding it. The geological investigation of the basin by borings has shown that to the south the bottom is sand; to the north, mud 30 feet thick in places; and underneath, a stiff tenacious clay. Some 18 feet below the surface of the water a bed of peat was bored through, showing that at one time the level of the lake was much below its present position: and there are marks of water as much as 100 feet above the present level, indicating a wide range within comparatively recent times. High levels are recorded in 1776, 1820-22, 1857, and 1879. In 1865 the surface of the lake was 7 feet lower than in 1879, the volume of water thus doubling itself in fifteen years. The physical results obtained so far are to the effect that the waters of the lake are grey in colour, and that the winter covering of ice attains a thickness of 18 inches. Biological investigations have disclosed the presence of 460 animal species and a varied microscopic flora. Special attention is being directed to the Plankton.

Among the more strictly meteorological communications, those of Dr. Woeik of (St. Petersburg) were of special interest. From recent observations, Dr. Woeikof has been confirmed in the belief that the intense winter cold of North-eastern Siberia is a very local phenomenon. In January, 1893, the air temperature recorded at a valley station in the province of Yeniseisk was 30·6° Fahr. colder than at a neighbouring station 1000 feet above it, and further to the north-east intense cold in the valleys must be of frequent occurrence. If elevation is taken into account in discussing the records of Siberian stations, a great pole of cold is not recognized in the north-eastern part of that area, but it is found that a stratum of air having a lower mean temperature lies over Greenland (Nansen's observations) and the North American archipelago, as well as over the Antarctic continent. In another paper Dr. Woeikof discussed the day temperatures of the lower layers of air, as observed by the Assmann aspiration psychrometer. The observations showed that with bare soil in full sunshine the air resting immediately on the ground was 22° to 36° Fahr. warmer than that three-quarters of an inch above it, and that this layer again was 4·5° to 6·5° Fahr. warmer than the air 20 inches from the ground. At 20 inches the temperature was still 1·5° Fahr. warmer than in a Wild's shelter 10 feet from the surface. The rate of fall of temperature close to the ground is certainly remarkable.

Dr. Brückner (Berne) discussed further researches on the effects of variations of climate on farming, pointing out that in oceanic and insular climates a bad harvest was usually caused by excessive rain, while in continental climates droughts were more frequently responsible for damage to crops.

On the motion of Dr. Neumayer (Hamburg), the combined sections representing geography, geodesy, meteorology, and physics, passed the following resolution expressing their sense of the immense importance of Antarctic exploration to all branches of science: That the Association of German Scientists and Physicians desires to urge upon the German Geographentag the advisability of directing its special attention to the question of penetrating and exploring the Antarctic continent, at its meeting at Bremen in April, 1895, and of ensuring that the views of German specialists shall be adequately expressed at the International Geographical Congress in London in 1895. In support of these efforts, it is proposed that a report should be drawn up embodying scientific opinion generally on the subject, the report to be presented at the next meeting of the Association in Lübeck.

During the sittings of the Association an exhibition of objects bearing on geography and geology was held in the rooms of the University.

GEOGRAPHICAL WORK BY THE GEOLOGICAL SURVEY OF CANADA IN 1894.

By Dr. G. M. DAWSON, C.M.G., F.R.S.

SOME geographical results of importance have again been obtained in connection with the operations of the Geological Survey of Canada during the year 1894, although but two parties have been at work in what may be called the unexplored regions of the Dominion. These were conducted by Mr. J. B. Tyrrell and Mr. A. P. Low.

In the *Geographical Journal* for March, 1894, it was stated that Mr. Low, after having completed the first part of his exploration in the Labrador peninsula, proceeded to Hamilton inlet, on the Atlantic coast of Labrador, for the purpose of passing the winter there, and in preparation for further work in the spring, by carrying inland as far as possible the necessary supply of provisions for the season's operations. With this object several men were sent up the Hamilton river with loaded canoes late in October. They succeeded in ascending the river about 100 miles, when they were stopped by ice. Câching the supplies here, they subsequently returned to the inlet on foot when the ice became strong enough for travel. A second party, under Mr. Low's assistant, Mr. Eaton, ascended the river for some distance, in January, hauling provisions in sleds, and early in March, a sufficient quantity of snow being on the ground to render travel over the rough ice possible, the main party started for the interior. The efforts of the party were then directed to moving forward the provisions from the câches already established, and by dint of much hard work and repeated trips to and fro, the supplies and canoes were carried inland as far as the vicinity of the Great Falls before the ice became unsafe. The Great Falls, it will be remembered, mark the furthest point reached by the Bowdoin College expedition in 1891.

At the end of May it was found practicable to launch the canoes and to proceed with the exploration by water. Sandy lake, into which the two main branches of the river flow, was made a base of operations. The south-west or Ashuanipi branch, with its lakes, was first examined; after which the survey was carried northward to Lake Michikamow, which proved to be some 80 miles long by over 30 miles in greatest width. The waters of this lake reach Hamilton inlet by the north-west river.

Having again retraced his route to Sandy lake, Mr. Low finally left that place on August 1, following up the south-east or Attikonak branch of the Hamilton southward to the height of land separating its waters from those of rivers flowing to the gulf of St. Lawrence. By means of the Romaine and St. John rivers the shores of the gulf were eventually reached near Mingan on August 22.

The explorations and surveys of 1894, taken together with those of the preceding year, give very important information on the geography and physical character of the interior of Labrador, including its geology.

Further particulars relating to this work will be given by Mr. Low in a paper to be presented to the Royal Geographical Society.

To the west of Hudson bay another line of exploration and survey was carried through the region of the Barren Lands by Mr. J. B. Tyrrell, who was accompanied by Mr. R. Munro Ferguson. This lay to the east of that followed by him in 1893, of which an account has already appeared in this *Journal.*[*] The route chosen was by way of Reindeer lake, situated in the northern part of the drainage basin of the Churchill. The journey from Grand rapids, near the mouth of the Saskatchewan, to the Du Brochet post of the Hudson's Bay Company, at the north end of Reindeer lake, involved a canoe voyage of about 600 miles by rivers and lakes already more or less completely surveyed.[†]

At Du Brochet post two Chippewyan Indians were secured as guides for the new country lying beyond. A stream named Ice river was first ascended for some distance to a portage route which led by Thanont and Theitaga lakes to Kasba lake, at the head of the Kazan or White Partridge river, in latitude 61° 10′, at a distance of 221 miles from Reindeer lake. Thanont and Theitaga lakes discharge their waters by the Thlewiaza river to Hudson bay.

The Kazan river was followed down to Ennaida lake, which lies at the northern edge of the wooded country, and here the Indian guides turned back. Some days later, and further to the north, the first camp of Eskimo was met with, and two of these people were enlisted as guides. Yath-kyed lake was subsequently reached, and the whole length of its west shore was examined. When in latitude 63° 7′, it was definitely ascertained that the Kazan discharged into Baker lake at the head of Chesterfield inlet, and, in consequence of information obtained from the Eskimo, it was determined to make a series of long portages to the eastward, by means of which another river was reached. This, being descended, was found to discharge into Hudson bay about latitude 62°, and the shore of the bay was attained on September 18. Fort Churchill was reached on October 1, and after waiting some time for the complete freezing over of the rivers and lakes, the return journey was begun with dog-sledges, by way of Split lake on the Nelson river, to which a track survey 275 miles in length was made on snow-shoes.

The route followed from Reindeer lake to the shore of the bay was about 815 miles in length, and by means of this survey and that of the previous summer it will now be possible to place most of the large lakes and rivers to the west of Hudson bay upon the map with some accuracy. The rocks met with along the entire route are almost exclusively referable to the Laurentian and Huronian systems, the area of Animikie rocks found in 1893 not extending so far to the east and south as the Kazan river.

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[*] November, 1894. [†] 'Report of Progress, Geol. Survey of Canada, 1879–80, part C.

THE MONTHLY RECORD.

EUROPE.

The History of the Development of the Danube. By Dr. Roman Hödl.*—The transverse passage of the Danube across the southern end of the Bohemian mountain system, *i.e.* broadly speaking, between Passau and Vienna, takes place, more strictly, in several distinct passes, since the southern end of the primitive rock-system sends a series of distinct limbs southwards, between which the Tertiary deposits from the south are interposed. The course of the Danube cuts across the southern end of the Bohemian system without regard to details of geological boundaries, taking a course from west to east now across the primitive, and now across the more recent formations, while only in places does its stream follow a line coinciding with the limits between the two. There is thus an alternation between narrow, deeply cut, rocky valleys, and more level expanses open towards the south. The passage of the Danube through this region is but rarely touched upon in literature, though the opinion has been occasionally expressed, but only as a conjecture, that its valley is pre-diluvial. A special treatise on the subject has not yet, to my knowledge, appeared. One small essay only deals with a tributary valley, that of the Inn, which empties itself into the rocky valley of the Danube near Passau. This essay, by Franz Bayberger (Kempten, 1886), is entitled, 'The Transverse Valley of the Inn from Schärding to Passau,' and in it the opinion is expressed that this transverse valley, which has a depth of from 300 to 650 feet, is *interglacial*, from which the necessary conclusion would follow, that the formation of the Danube valley also took place *during* the Ice Age. A detailed examination of the section from Linz to Krems has now shown that all the three terraces of the Alpine borderland—viz. the diluvial deposit, the high terrace, and the low terrace, can be traced throughout this part of the Danube valley. The diluvial flat sinks gradually from the Alps to the Danube, and is still cut through by that river at the present day, so that even on the left bank portions of terrace belonging to the diluvial flat are to be found. The deposits consist principally of fragments of quartz and limestone, covered with a layer of loess. The average depth is 115 to 130 feet. In the valleys of the Alpine tributaries the upper terraces project downwards into the Danube valley, and end there with a height of from 65 to 100 feet. They likewise consist of limestone and quartz fragments, the limestone predominating in the eastern section in Lower Austria. These deposits too are overlaid with loess. Lastly, the lower terrace is to be found on the valley floors, and here the loess is wanting. Occasionally the southern flat appears higher than the northern, as, *e.g.*, at the mouth of the Traun. We have here a large cone of detritus brought down by the Traun, which has been cut through by the Danube. This cone of detritus sinks from south to north, and, inasmuch as the Danube valley is 3 to 4 miles broad, the southern escarpment (230–300 feet) is considerably higher than the northern (130–160 feet). In a section, a line drawn in the direction of fall of the cone of detritus exactly strikes the northern terrace. These terraces continue at the present day through the rocky narrows, and allow the conclusion that the passage through the range is *pre-glacial* and has been deepened since the first glaciation to the extent of, in round numbers, 130 feet. In this process an amount of material of about 3⅛ cubic miles must have been removed between Linz and Krems. On a more extended excursion from Passau to Linz, which is to be followed by a more detailed study, altogether analogous conditions were observed, and we can have no hesitation in putting down the whole passage of the Danube through the Bohemian mountain system as *pre-diluvial* or *pre-glacial*. Besides the above-mentioned terraces, an additional one is met with at a height of about 320 feet, which is particularly well marked between Ybbs and Melk, and, as it displays nothing but quartz, must owe its origin to a *tertiary stream*. Now, since a deposit of tertiary sand also is found near Melk beneath this bed of shingle, we see from this that we have in this locality a valley which was formed before the Neogene, and thus *during the Tertiary epoch*. Further, a valley with Tertiary deposits can be followed from the Danube behind the Ostrong and Jauerling until it reaches the Danube again, and allows us to lay down a pre-neogen valley system. Thus, as a result of the recent investigations, we arrive at the following conclusions: (1) The deposits left behind by the thrice-repeated glaciation of the Alps, can be traced in the Danube valley from Passau to Krems. (2) The transverse passage of the Danube through the Bohemian mountain-system is *pre-Glacial*, and in many parts *pre-Neogene*.

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* Communicated by Dr. Peucker.

ASIA.

The Baluch-Afghan Boundary Commission.—The work of this Commission, which is to deal with the whole extent of the Afghan frontier from the Gomul to Persia, is making good progress. During 1894, Captain R. J. H. L. Mackenzie accomplished a large out-turn of survey in connection with the Commission, the amount of actual new work being extended over a little more than 4000 square miles of country, while triangulation was carried on from sixteen new stations. The number of miles of boundary actually demarcated in the same period (nine months, March to December) was 300 miles, a most creditable piece of work. Captain Mackenzie also joined in with the Waziristan survey on the one side, and the Kandahar survey on the other, while he also continued his labours with the Takht-i-Suliman and Zhob surveys. Most of the plane-tabling was done by Gopal Singh, sub-surveyor, under difficulties of no ordinary character. Lieut. Benn, of the Sind Horse and Bombay Staff Corps, has been diligently collecting military information for the Intelligence Branch, respecting the country from Domani on the Gomul to New Chaman, while new routes through Southern Afghanistan have been examined and joined up with those already visited. Various unknown tracts have been reported on, including the province of Tirwa, which has hitherto been almost a *terra incognita*. Captain McMahon, assisted by Khan Bahadur Haq Nawaz Khan, has been engaged on the above-mentioned demarcation, and has thus completed the first section of his long task. The mission is now expected to move southwards, defining the boundary between Shararud and Shorawak to Nushki, whence it will enter a waterless tract and run southwards of the Helmand river, across the Lut desert, to the Persian frontier. It is hoped that the borders of Persia may be reached before the hot season sets in. Another sectional party of the Commission is engaged in the valley of the Kunar river, where, under the supervision of Mr. Udny, it will lay down the boundaries of Afghanistan and Chitral, with special reference to the claims of Umra Khan, of Chandawul, on the one side, and the Kaffirs on the other, both these parties occupying intermediate tracts in the valley. It is these conflicting jurisdictions that have prevented this direct and valuable route between the Indus and the Oxus from being hitherto used as fully as it should have been.

Dr. Sven Hedin's Explorations in Central Asia. We have received a letter from Dr. Sven Hedin (see *Journal*, vol. iv. p. 457), dated at Kashgar, January 12 last, in which, while promising the early despatch of an article descriptive of his four ascents of Mount Mustagh-ata, for publication in the *Journal*, he also gives some details as to his plans for future operations. He was intending to start in another ten days for Maralbashi *en route* for the Mazar-tagh (discovered by Prjevalsky between the Yarkand and Khotan rivers). He next proposes to explore the interior of the Tarim desert, and then to attempt to reach the mountains of Northern Tibet, perhaps visiting Lob Nor on the way. At Kashgar Dr. Hedin had met Mr. and Mrs. Littledale, and speaks of the great pleasure which he derived from their society. They had, after some uncertainty as to their future route, eventually decided on that *viâ* Khotan, intending to attempt the ascent of the Tibetan plateau by way of Cherchen. Dr. Hedin expresses his doubts as to their success, with only camels and donkeys, in view of the experiences of Pievtsov and Grombchevsky, when making the same attempt. He considers that yaks alone can cross the plateau. Mr. Littledale, if unsuccessful in the attempt to reach Lhassa, would return to India *viâ* Leh.

AFRICA.

Visit by Consul Churchill to Table Mountain, Mozambique.—In a despatch kindly forwarded to the Society from the Foreign Office, dated November 16 last, Consul Churchill encloses an account of a visit to Table mountain (Meza in Portuguese), which lies midway between the head of the Nakala inlet of Fernão Velloso bay and that of Conducia bay, a little north of Mozambique. It was by this latter bay, and the river Sinyudi, which empties into it, that the base of the mountain was approached. There is deep water throughout the centre of the bay, and above Bar point is a deep and sheltered basin. A boat may navigate the river for about 8 miles in three hours during spring tides. The lower part is surrounded by mangroves, but higher up the banks become steep and show signs of receiving a fair volume of water, but there was no fresh water at the time of the visit (the end of the dry season). An advance being made on foot, the dry bed of the river was crossed higher up. About 2 miles from the base of the mountain are numerous deep gullies filled with luxuriant tropical vegetation—the first seen by the writer in the vicinity of Mozambique. Attempts to find a practical route for the ascent having failed on the south and west sides, owing to the almost perpendicular walls of rock, a native guide was at last found who led the party to the summit by the usual path at the north-east end. The summit, which is nearly level—the aneroid showing 990 feet as the greatest,* and 700 feet as the least elevation—was covered with thick forest, so that it was difficult to obtain a view; but where this was achieved, the surrounding country was seen to be very flat and monotonous, consisting of forest of a prevailing light brown colour. The mountain is composed of sandstone, covered on the top and near the base with rich dark mould. Its summit measures about 1¼ by ¾ of a mile. The district round the mountain (Matibani) is rich in timber, the principal kinds being African teak, ebony, and mahogany. Little game was seen, but it is said to be plentiful in the rains. Aided by the forest, the inhabitants of the neighbouring district of Nakusha, though probably not over 1000, are able to hold their own against intruders, and their head chief occupies a perfectly independent position.

British Central Africa.—By the agreements signed on November 24 last, between the Right Hon. Cecil Rhodes and the British Government, the provisional arrangements under which the Imperial Commissioner for territories under British influence north of the Zambezi exercised a general supervision over the territories of the South Africa Company north of the Zambezi, will come to an end not later than June 30, 1895. While the British Central Africa Protectorate will remain, as hitherto, under the control of the commissioner, the rest of the territory within the British sphere up to Lake Tanganyika will be under the control of the company's administrator at Salisbury. We may expect, as a result, a speedy increase in our knowledge of the wide districts north of the Zambezi (including a large part of the Barutse country) for which we have hitherto depended on the accounts of a few travellers, such as Holub, Selous, Capello and Ivens, and Thomson. A paper by the last-named is to be found in the *Geographical Journal*, vol. i. (1893), p. 97, while for the north-eastern parts of the territory, which are rapidly becoming better known, we may refer (in addition to the works of Livingstone and Giraud) to the accounts of the journeys of Mr. Alfred Sharpe, published in the R.G.S. *Proceedings*, 1892, p. 36, and *Journal*, vol. i. (1893), p. 524, and to the interesting reports appearing from time to time in the *British Central Africa Gazette*. In the territory of the South Africa Company south of the Zambezi, the question of the boundary with the Portuguese possessions on the east is still pending. The accurate determination of positions necessary to the delimitation of the boundary was carried out by the English and Portuguese Commissions, but the matter at present in dispute is one of the interpretation of the agreement of 1891, which fixed, as the line to be followed, "the upper part of the eastern slope of the Manika plateau," and it appears to be a point at issue whether the word "plateau" should include the hilly borderlands, or only the more level country further west. The question is under arbitration.

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* The true height is given as 1095 feet.

Map of the Neighbourhood of Timbuktu.—A map is published in the *Comptes Rendus* of the Paris Geographical Society (1894, Nos. 18, 19), which presents some new details respecting the country on the left bank of the Upper Niger south-west of Timbuktu. Compiled by Lieut. Bluzet, it embodies both the personal observations of this officer and other information collected by the French military authority in those parts. In particular, the north-western limit of the inundations of the Niger is carefully laid down, together with the various lakes and back waters which connect with the stream. An extensive swampy depression due west of Timbuktu, known as the Lake of Fagnibine, is also shown. This is connected with the Niger by the channel which passes the town of Gundam, one of the French administrative centres, the neighbourhood of which is shown with greater accuracy than in previous maps.

Export of Ivory and Caoutchouc from Africa.—From the *Mouvement Géographique* (1895, No. 1) we gather the following details respecting the recent exports of these articles. While the total amount of ivory received in London in 1894 was considerably less than the average for the former three years, that received at Antwerp, though less than in 1893, was far above the same average. A certain amount which formerly found its way from Central Africa to Zanzibar has lately been exported *viâ* the Congo, by which route also some of that exported from the Central Sudan has reached the coast. From the same parts a large quantity has been carried across the Sahara to Bengasi, on the Mediterranean, so that Egypt is no longer the sole recipient of this supply. Although the amount from East Africa has fallen but little short of the mean for the former five years, its inferior quality points to a great diminution in the future. While the qualities received from the Niger, Cameroons, and Gabun have fallen considerably of late years, the increase from Central Africa has maintained the total export from the West Coast. The quantities of caoutchouc received in Antwerp have steadily increased from 4·6 tons in 1889 to 270 tons in 1894, and the quality has also improved, through greater care in its collection. Antwerp appears destined to become the principal *entrepôt* on the Continent for this article.

Portuguese West Africa.—The *Mouvement Géographique* (1894, p. 112) gives figures showing the progress made in the commercial development of Portuguese West Africa since the beginning of the railway from St. Paul de Loanda to Ambaca. On July 30, 1894, this line had been opened for a distance of 175 miles. Since 1886, the year in which work was begun, the customs receipts at Loanda have been more than quadrupled. The gross receipts of the line have also risen from 1147 francs per kilometre in 1890–91 to 2178 in 1893–94.

NORTH AMERICA.

Glacial Phenomena of Newfoundland, Labrador, and Southern Greenland.—Mr. G. J. Wright, in an article in the February number of *the American Journal of Science,* gives the results of his observations, made in connection with Dr. F. A. Cook's expedition to the Arctic regions in the summer of last year, upon the glacial phenomena of Newfoundland, Labrador, and Southern Greenland. The most important inferences deduced from the facts he observed are, that the ice-sheet of Southern Greenland formerly sent glaciers down through all the fiords, filling them to a height of about 2000 feet, and pushing even to the margin of the continent. Greenland has therefore had its ice age, which has already partially passed away. During the maximum of the ice extension the mountains bordering the sea in Southern Greenland formed innumerable nunataks. The ice was not thick enough to cover them in solid mass, and there is no probability that the ice extended far out into Davis Straits. On the other hand, it is pretty evident that in Labrador and Newfoundland all the mountains were completely covered with glacial ice, which extended far out over the bordering continental plateau. But this was at that time probably elevated above the sea-level, so that it is doubtful if the ice ever extended far into the sea. The facts point to considerable pre-glacial elevations of land followed, in Labrador at least, by a period of extensive depression below the present level, and subsequent partial elevation. The freshness of the glacial striæ in exposed places, and the small amount of modification which has taken place in the topography since the retreat of the ice, sustains the abundant evidence elsewhere found of the recent date of the glacial period; while the indications of recent changes of level point to terrestrial rather than astronomical causes to account for the vicissitudes of the glacial period.

Alaska—The Position of Mount Logan.—In the note entitled "Geographical Work on the North-American Pacific Coast in 1894," which appeared in the February number of this Journal (p. 172), Mount Logan is stated to be situated "about 17 miles north-eastward of St. Elias." Taking the positions assigned by the recent triangulation to these two peaks, and given in the note as being correct, this cannot be the case, and the true distance is found to be 22·6 geog. miles (or 26 stat. miles), while the bearing of Mount Logan from Mount St. Elias is N. 43° 25′ E.

AUSTRALASIA.

Necker Island.—In the last number of the *Journal of the Polynesian Society,* a brief description is given of Necker Island. This little spot, proposed as one of the stations on the contemplated telegraphic cable line from Vancouver to Australia, was taken possession of by the Hawaiian Government on May 27, 1894. The island is situated in the North Pacific Ocean, about 450 miles W.N.W. from Honolulu, in latitude 23° 35′ N., longitude 164° 34′ W. It is a barren lava rock about 260 feet high. An interesting discovery of idols and stone walls, resembling monuments, has recently been made, showing that the island was formerly inhabited, probably by people resembling the cyclopean builders of so many other Polynesian islands.

GENERAL.

The Methods of Geography.—A new publication has lately been started in Germany, under the editorship of Dr. R. Lehmann, which is to deal principally with the methods of geography, both from a scientific and from an educational point of view. It will not be a regular serial, but the parts will come out at indefinite intervals, according as suitable material is forthcoming. The first number opens with a discussion by Dr. A. Kirchhoff of Professor Hirschfeld's propositions with respect to a modification of the system of geographical education, in which the former deprecates the division of the subject into a physical and an historical-political side, which, though perhaps practicable in the case of general geography, is especially unsuited for the study of the regional branch of the subject, in which the human element cannot be properly studied apart from the physical geography of the environment. The division should rather be, in Dr. Kirchhoff's opinion, between general physical geography and regional geography (*Länderkunde*). The second contribution is a sketch by Dr. W. Ule, of a course of practical work in geography, suitable for the universities; but by far the greater part of the number is taken up with the elaboration by the editor of a plan for the systematic collection of material suitable for the requirements of teachers of *Heimatskunde*. Having pointed out the difficulties which beset the individual teacher in the absence of suitable text-books—those which exist being rather intended for the use of scholars than teachers—Dr. Lehmann suggests that, in the larger centres at any rate, the various educational establishments should co-operate in the collection and arrangement of the material required. He then gives an outline scheme of the various headings under which such material should be arranged, and the particular points which should be kept in view in filling them in; concluding with some remarks on the practical application of the system, and the results likely to ensue from its use. Dr. Lehmann purposes to give from time to time a series of such discussions on the methods of geographical education, which may be regarded as supplementary to his large work on the subject in course of publication.

Prof. Flahault on Botanical Mapping.—Professor Flahault, Director of the Botanical Institute at Montpellier, has undertaken to discuss the botanical geography of France for Engler and Drude's *Vegetation der Erde*. During the past two years he has spent all his spare time in botanizing in the south, and has prepared a map of the distribution of plants for an area equal to one-tenth of the whole country. This is now in the press. In the mean time, Professor Flahault has contributed a note to the Paris Academy of Sciences (*Comptes Rendus*, cxix. p. 1236), in which he discusses some of the difficulties to be overcome in such a work. While it is a simple enough matter to map the distribution of a single species, it is necessary to eliminate much detail in preparing a map of natural regions of vegetation. He finds that he is able to arrive at satisfactory results by mapping the distribution of a judicious selection of plants, which characterise a floral region as precisely as typical fossils do certain geological strata. One other practical difficulty is to eliminate human action in a given region so as to arrive at the natural distribution of spontaneous species. By direct observation, and a knowledge of forestry experiments during the past century, supplemented by archæological and philological evidence, a sufficiently satisfactory solution is attained; the result of which is to persuade Professor Flahault that these spontaneous species are the likeliest to survive, if they have a fair chance. This is a fact of supreme importance in forestry, where it is difficult to decide which species is the best for a given elevation and exposure; and to foresters the new map should be of economic as well as scientific utility.

The Proposed Map of the World on the Scale of One-Millionth.—The Technical Commission of the Geographical Society of the East of France has issued from its head-quarters at Nancy a detailed report on the project of securing the compilation of a complete map of the world on the scale of 1 : 1,000,000, or 16 miles to an inch. After discussing the advantages of the scheme and various objections which have been taken to it, especially with regard to the choice of an initial meridian and the use of the metric system, the general conclusions come to are approval of the scheme as a whole, subject to a formal agreement of all the Powers concerned, that the metric system be employed for heights, and that the initial meridian be an oceanic one, preferably that of 25° W. from Greenwich. The polyconic or tronconic projection is recommended, and a sea-level datum, and intervals for contouring are suggested. Two editions of the map are proposed, one showing only physical features, and the other complete with ocean routes and means of communication. The official orthography of all names in languages expressed in the Latin alphabet to be retained, and languages in other alphabets to be transliterated by definite rules, without the use of accents or diacritical marks.

Changes in Geographical Publications.—With 1895 the Italian Geographical Society has changed the character of its *Bolletino*, and, following the example of the Paris and Berlin Geographical Societies, has commenced to issue two distinct publications. The *Bolletino* will now contain merely the proceedings of the Society, notes, and bibliography, and will be published monthly. The original papers communicated to the Society will be published in the *Memorie*, which will form an annual volume of about 500 pages, and take the place of the extra volumes formerly published. The popular French weekly, the *Tour du Monde*, has also assumed a new form by incorporating its former supplement, *Nouvelles Géographiques*, and greatly increasing the variety of its contents. Space is given to queries on geographical subjects, and a practical guide to tourists wishing to visit the scenes described in the principal articles is made a special feature.

OBITUARY.

Reginald Thistlethwayte Cocks.

It is with much regret that we record the death of Mr. Reginald T. Cocks, who for twenty-seven years acted as the Society's Treasurer. He was born in 1816, and educated at Westminster School and Christchurch, Oxford. After spending some time in Germany, he entered the bank in 1839, in which he subsequently became a partner. Mr. Cocks became a Fellow of the Society in 1841, and in 1863 succeeded Mr. R. Biddulph as Treasurer. Mr. Cocks's services, which were purely honorary, were of the greatest benefit to the Society, in whose welfare he took a genuine and active interest. Mr. Cocks retired from the firm of Messrs. Cocks, Biddulph & Co. in 1892; he died on January 13 last. He married Miss Stuart, daughter of W. Stuart, Esq., of Aldenham Abbey, Herts., who predeceased him, and leaves surviving an only daughter.

Rev. Alexander Mackay, LL.D.

The Rev. Alexander Mackay, LL.D., author of 'A Manual of Modern Geography' and other text-books, died at Ventnor on January 31, in the eightieth year of his age. Dr. Mackay was a native of Caithness, and a minister of the Free Church of Scotland, but finding the charge of a congregation less congenial than literary work, he early devoted himself to the study of geography and kindred subjects. His books have had a very large circulation, and are characterized by the best qualities of the old school of geographical text-books, being full of facts systematically arranged, scrupulously verified, and illustrated by brief notes of more general interest. In one instance, however, he made an attempt to fasten the elementary facts on the minds of young scholars by producing a 'Rhyming Geography,' some of the stanzas in which, once read, are difficult to forget. Dr. Mackay's most arduous piece of work was an ingenious mnemonic system for remembering numbers, which he developed in a book entitled 'Facts and Dates.'

He also wrote extensively on other subjects. Dr. Mackay's eldest son, inheriting his father's geographical tastes, and having also a remarkable aptitude for engineering, became one of the earliest missionaries to take up residence in Central Africa, and his name, "Mackay of Uganda," occupies an important place in the history of African civilization. Dr. Mackay joined the Royal Geographical Society in 1859.

CORRESPONDENCE.

Kolgueff: Forgotten Visits.

As it is suggested by Mr. Seebohm in the February number of the *Journal* that Messrs. Battye, Powys, and Hyland were probably the first Englishmen to visit Kolgueff, it is only fair to give credit to the old navigators, and recall the visits of Richard Finch and William Gourdon, two hundred and eighty odd years since. As long ago as 1611, Richard Finch, in a letter to Sir Thomas Smith, Governor of the "Worshipfull Companie of English Merchants trading into Russia," wrote as follows: "The seventh of August, William Gourdon and I with our shallop went on shoare. This Colgoiene is a very long and broad Iland with many vallies in it. On the same are many Geese, which the Russes use to take with Nets in the time of the yeere, before they bee ouer fledge. In this Iland seemeth to bee store of Hawkes. Here William Gourdon and our cooper caught two Hawkes, whereof one was spoyled in the taking, the other remayneth aliue."

And William Gourdon himself writes in the same year that "the third [August] at noone we had sight of Colgoiene Iland and tooke the latitude, being on the North side of the island, which was 69 degrees 20 minutes: and at night I went on shoare to see the Land, which was high clay ground: and I came where there was an airie of Slight-falcons: but they did flie all away saue one, which I tooke up, and brought aboord. This Ile of Colgoiene is but thirtie leagues from the Barre of Pechora."

There may be other instances, but these occur to me at once.

ARTHUR MONTEFIORE, F.G.S.

MEETINGS OF THE ROYAL GEOGRAPHICAL SOCIETY, SESSION 1894–95.

Fifth Ordinary Meeting, January 28, 1895.—CLEMENTS R. MARKHAM, ESQ., C.B., F.R.S., President, in the Chair.

ELECTIONS.—*Major George Newton Barlow, R.A.; Thomas Bland; William Thomas Brand; Rupert Fitzroy Bromley; Alexander Jno. Currie, M.D.; Colonel W. T. Eden (Indian Staff Corps); Newenham A. E. Graydon; Reginald Edward Guise; Lieut. Wm. Albert Harrison, R.E.; William Howat; Rev. Henry Walford Hussey; George Hudson; Captain F. H. Lyell; Dr. Anatolius Markoff; Captain the Hon. H. D. Napier (Indian Staff Corps); John Pemberthy; Richard Phillipps; Lieut.-Colonel William W. Rawes, R.A. (Retired); Rev. Frederick Charles Rogers; H. J. Snow; Rev. Harry de Trevelec; William Francis Wallenstein; John Henry Whadcoat.*

The PRESIDENT said: Before I speak on the subject of the meeting, the Fellows will be glad to hear what progress we have made with the subscriptions for the Geographical Congress. £620 have already been subscribed by the Fellows, making, with the amount already subscribed by the Geographical Society, £1420, which we have to make up to £3500; so we must still work hard in getting subscriptions. On the 22nd we had a technical meeting in the map-room of the Society, when an address was given us by Prof. Rücker on terrestrial magnetism, which was most successful and most interesting, and led to an equally interesting discussion; and I think we may now consider that these scientific technical meetings have been well established. Both the Fellows present and the whole body of Fellows, I am sure, will thank Prof. Rücker for his great kindness in consenting to give us so interesting an address. I find that a great many Fellows make inquiries about the times when there will be meetings, and other questions. If they will refer to page iv. of the advertisements in the *Journal* each month, they will find all particulars both respecting the meetings and everything else relating to the Society.

The Paper read was :—

"Journeys in South-Western Siam." By H. Warington Smyth.

Sixth Ordinary Meeting, February 11, 1895.—CLEMENTS R. MARKHAM, ESQ., C.B., F.R.S., President, in the Chair.

ELECTIONS.—*Lieut. Henry Butterworth, R.N.R.; Edward North Buxton; Lieut. John Ramsay Craigen, R.N.R.; David Hepburn; Rev. John Magill; Major H. G. Mainwaring; Theodore E. Mavrogordato; Captain Henry Robert F. Plater; Captain John Sparks; Charles Bernard Ward.*

The Papers read were :—

1. "Journeys in North-West British Guiana." By G. G. Dixon.
2. "A Journey in German New Guinea." By Captain Cayley Webster.

GEOGRAPHICAL LITERATURE OF THE MONTH.

Additions to the Library.

By HUGH ROBERT MILL, D.Sc., *Librarian*, R.G.S.

THE following abbreviations of nouns and the adjectives derived from them are employed to indicate the source of articles from other publications. Geographical names are in each case written in full :—

A. = Academy, Academie, Akademie.
Ann. = Annals, Annales, Annalen.
B. = Bulletin, Bollettino, Boletim.
Com. = Commerce, Commercial.
C. R. = Comptes Rendus.
Erdk. = Erdkunde.
G. = Geography, Geographie, Geografia.
Ges. = Gesellschaft.
I. = Institute, Institution.
J. = Journal.
M. = Mitteilungen.
Mag. = Magazine.
P. = Proceedings.
R. = Royal.
Rev. = Review, Revue, Revista.
S. = Society, Société, Selskab.
Sitzb. = Sitzungsbericht.
T. = Transactions.
V. = Verein.
Verh. = Verhandlungen.
W. = Wissenschaft, and compounds.
Z. = Zeitschrift.

On account of the ambiguity of the words *octavo*, *quarto*, etc., the size of books in the list below is denoted by the length and breadth of the cover in inches to the nearest half-inch. The size of the *Journal* is 10 × 6½.

EUROPE.

Austria—Croatia. *Deutsche Rundschau G.* 17 (1895): 220–224. **Franić.**

Orometrie des Lika-Cacka oder Oberkroatischen Hochlandes und dessen geographische Bestandtheile. Von Professor Karl Franić in Esseg.

Austria—Lake Balaton. ———

Bericht über die Tätigkeit der Plattensee-Commission der Ung. Geogr. Gesellschaft in den Jahren 1892–93. Separatdruck aus der "Abrégé" der Bull. de la Soc. Hongr. de Geographie Année XXII. Budapest, 1894. Size 9½ × 6½, pp. 44. *Maps, etc.*

The results will be referred to in the Monthly Record.

English Lakes. *J. Geological S.* **51** (1895): 35–48. **Marr.**

The Tarns of Lakeland. By J. E. Marr. *With Maps.*

This paper was briefly noticed in the *Journal* for January, p. 77.

Europe—Industrial. *Deutsche Rundschau G.* **17** (1895): 228–229. **Webersik.**

Die Textilindustrie Europas. Von Gottlieb Webersik. *With Map.*

The map, on the scale of 1 : 15,000,000, shows by appropriate signs the distribution of manufactures of linen, wool, cotton, and silk, with an indication of the relative magnitude of the industries in each town or district.

Europe—Mapping. **Botto.**

Progressi fatti negli ultimi tempi dalla cartografia nei vari Stati di Europa e più specialmente in Italia. Relazione del Ten. Colonnello del genio A. Botto. Atti del Primo Congresso Geografico Italiano tenuto in Genova, 1892. Vol. ii. part i. Genoa, 1894. Pp. 195–267.

France—Mountain Lakes. *C.R.* **120** (1895): 54–56. **Delebecque.**

Sur quelques lacs des Alpes, de l'Aubrac et des Pyreneés. Note de M. A. Delebecque.

This will be referred to in the Monthly Record.

Germany—Lorraine. **Witte.**

Das Deutsche Sprachgebiet Lothringens und seine Wandelungen von der Feststellung der Sprachgrenze bis zum Ausgang des 16 Jahrhunderts. Von Dr. Hans Witte. Stuttgart: J. Engelhorn, 1894. Size 9½ × 6¼, pp. 130. *Map.*

This memoir is part vi. of vol. viii. of Kirchhoff's 'Forschungen zur deutschen Landes- und Volks-kunde.' It is an historical summary of the variations in the German-speaking areas in Lorraine, and the map shows the linguistic boundary for the dates 1000 A.D., 1500, and the present time.

Italy—Earthquakes. **Baratta.**

Sulla distribuzione topografica dei terremoti in Italia durante il quinquennio 1887–91. Saggio di Geografia sismica di Mario Baratta. Atti del Primo Congresso Geografico Italiano tenuto in Genova, 1892. Part i. Genoa, 1894. Pp. 180–189. *With Maps.*

Italy—Emilian Region. **Corti.**

Le Provincie d'Italia sotto l'aspetto geografico e storico descritte da Siro Corti. No. 60, Regione Emiliana. Provincia di Parma, pp. 58. No 61, Provincia di Ravenna, pp. 64. No. 62, Provincia di Reggio Emilia, pp. 54. Turin: G. B. Paravia & Co., 1894. Size 8 × 5. *Maps and Illustrations. Price of each No.* 50 *c.*

Italy—Magnetic Survey. **Tacchini.**

Sulle carte magnetiche d'Italia eseguite da Ciro Chistoni e Luigi Palazzo per cura del R. Ufficio Centrale Meteorologico di Roma. Relazione di Pietro Tacchini. Atti del Primo Congresso Geografico Italiano tenuto in Genova, 1892. Vol. ii. part i. Genoa, 1894. Pp. 149–179. *With Plates.*

Italy—Tides. **Grablovitz.**

Sulle osservazioni mareografiche in Italia e specialmente su quelle fatte ad Ischia, Memoria di Giulio Grablovitz. Atti del Primo Congresso Geografico Italiano tenuto in Genova, 1892. Vol. ii. part i. Genoa, 1894. Pp. 7–36. *With Plates.*

Montenegro. *Globus* **67** (1895): 111–113. **Hassert.**

Der Name Montenegro. Von Dr. Kurt Hassert. Leipzig.

A discussion of the various theories to account for the name of "Black Mountain" being fastened on the country—whether from dark rocks, dense pine forests now vanished, the dark complexion of the inhabitants, from the name of a ruler, the bad reputation of the mountaineers, or from "Crni Bog"—the black god, or devil, whose home was reputed to be there.

Russia—Northern Lakes. *Globus* **66** (1894): 383–385. **Krahmer.**

Kulikowski's Untersuchungen über das Zuwachsen und das zeitweilige Verschwinden der Seen in dem Gebiete von Onega. Von Generalmajor z. D. Krahmer, Wernigerode.

On the variations of level of the North Russian lakes in the neighbourhood of Lake Onega.

Russia—Novorossisk. *B.S.G. Com. Paris* **17** (1895): 24–43. **Bourge.**

Novorossisk (Georges Bourge). *With Maps.*

A description of Novorossisk, the recently developed Russian seaport on the Black Sea east of the Sea of Azoff, which has now been brought into railway communication with the centre of Russia, and by a line north of the Caucasus with Petrovsk, on the Caspian.

Switzerland—Upper Engadine. **Coolidge.**

La Haute-Engadine et le Bregaglia à travers les siècles. Histoire et Bibliographie par W. A. B. Coolidge. Extrait de *Le Massif de la Bernina* par August Lorria et E. A. Martel, avec la collaboration de Rev. W. A. B. Coolidge et J. Caviezel. Zurich, 1894. Size 12 × 9, pp. 68. *Illustrations. Presented by the Author.*

We understand that this extract is published in advance of the splendidly illustrated quarto of which it will form a part.

ASIA.

Asia-Minor. *Globus* **67** (1895): 101–107, 120–125. **Kannenberg.**

Die "Paphlagonischen" Felsengräber. Von Kannenberg. *With Illustrations.*

Baluchistan. **Holdich.**

Notes on the Antiquities, Ethnography, and History of Las Bela and Makran. By Colonel S. H. Holdich. Calcutta: Office of the Superintendent of Government Printing, India, 1894. Size 13½ × 8½, pp. 12. *Plate. Presented by the Author.*

Bhutàn and Sikkim. **Louis.**

The Gates of Thibet. A bird's-eye view of Independent Sikkhim, British Bhootan and the Dooars as a Doorga Poojah Trip. By J. A. H. Louis. Calcutta: the Catholic Orphan Press, 1894. Size 10 × 6½, pp. 184. *Map and Illustrations. Presented by the Author.*

Mr. Louis has enriched the copy of this most interesting book, which he has presented to the society, with a number of additional photographic illustrations which do not appear in the published edition. We hope to be able to devote an adequate notice to this enterprising trip through the little-known borderlands of India.

Central Asia. *Petermanns M.* **41** (1895): 6–13. **Krahmer.**

Die Expedition der Kaiserl.-russischen Geogr. Gesellschaft nach Mittellasien. Von Krahmer, Generalmajor z. D.

Central Asia. *Globus* **66** (1894): 332–335, 348–351. **Heyfelder.**

O. Heyfelder, Zur Kenntnis der Bevölkerung Bucharas. Mitgeteilt von Dr. H. Obst in Leipzig.

Central Asia—Pamirs. *B.S.G. Italiana* **(3) 7** (1894): 635–670, 788–816. **De Rocca.**

Il Pamir e le regioni adiacenti, Relazione di viaggio del Socio cav. Felice De Rocca. *With Sketch-map.*

China. **Mears.**

[Review of] "Society in China" [by Prof. Douglas]. By W. P. Mears. Reprinted from *The Scottish Geographical Magazine* for September, 1894. Size 10 × 6½, pp. 6. *Presented by the Author.*

China—Peking. *J.S. Arts* **43** (1895): 207–221. **Child.**

Peking. By Thomas Child. *With Plan.*

A full and interesting account of Peking, with a plan of the town, and many interesting details regarding the examination system, and the great examination hall of Peking with 15,000 cells for candidates.

Chinese Civilization. **Lacouperie.**

Western Origin of the Early Chinese Civilization from 2300 B.C. to 200 A.D.; or, Chapters on the elements derived from the old civilizations of West Asia in the formation of the ancient Chinese culture. By Terrien de Lacouperie. London: Asher & Co., 1894. Size 10½ × 6½, pp. xiii. and 416. *Price* 21*s.*

This learned work considers the evidence of early influence on China exercised by the Babylonians and Elamites at a very early period, and gives in considerable detail the records of later intercourse between West and East down to 220 A.D. In conclusion the author finds clear evidence that China presents after all only "an important instance of the general fact gradually disclosed by the process of historical research, that in all investigated cases, culture is the result of an introduction from abroad, and not of a spontaneous development."

Cyprus. *J.R. Colonial I.* **26** (1894–95): 110–125. **Mavrogordato.**

Cyprus and its Resources. By T. E. Mavrogordato.

Dutch East Indies. **Van der Chijs.**

Nederlandsch-Indisch Plakaatboek, 1602–1811. Door Mr. J. A. Van der Chijs. Twaalfde Deel, 1795–1799. 's Hage, M. Nijhoff, 1894. Size 8½ × 5½, pp. 1154.

Eastern Asia. **Curzon.**

Problems of the Far East. By the Hon. George N. Curzon, M.P. Japan—Korea—China. Third edition. London: Longmans & Co., 1894. Size 9 × 6, pp. xx. and 442. *Maps and Illustrations. Price* 21*s.*

This work, although the outcome of the author's extensive travels in Asia, does not profess to be a book of travel, dealing rather with the comparative study of the political, social, and economical conditions of the countries of the Far East. Nevertheless, so far at least as Korea is concerned, the volume contains much new matter which is of great geographical interest, and the author's word-paintings of scenery and cities are admirable examples of geographical description.

India. **Wilson.**

After Five Years in India; or, Life and Work in a Punjaub District. By Anne C. Wilson (A. C. MacLeod). London: Blackie & Son, 1895. Size 8 × 5½, pp. 312. *Illustrations. Price* 6*s. Presented by the Publishers.*

A bright and fresh account of modern life in India, with special reference to the work of the British magistrate. It gives a better idea of the details of administration of the country than most official writings, while it is thoroughly popular in style and aim.

India. **Woodrow and Lawson.**

Records of the Botanical Survey of India, vol. i. No. 4. Notes on a Journey from Haveri to Kumta. By G. Marshall Woodrow. Notes of a Tour in Travancore, etc. By M. A. Lawson. Calcutta, 1894. Size 9½ × 6½, pp. [12].

India—Historical. **Danvers.**

The Portuguese in India, being a History of the Rise and Decline of their Eastern Empire. By Frederick Charles Danvers. 2 vols. London: W. H. Allen & Co., 1894. Size 9 × 6, pp. (vol. i.) liii. and 572; (vol. ii.) xv. and 580. *Maps, Plates, and Portraits. Price* 42*s.*

Further notice will be given of this work.

India—Indus Delta. **Haig.**

The Indus Delta Country. A Memoir chiefly on its Ancient Geography and History. By Major-General M. R. Haig. London: Kegan Paul & Co., 1894. Size 10½ × 6½, pp. 6 and 148. *Maps. Presented by the Author.*

An historical memoir, giving an account of the past geography of the Indus delta as compared with its present condition. It will be separately noticed.

India—Kashmir. **Duthie.**

Records of the Botanical Survey of India, vol. i. No. 3. Report on a Botanical Tour in Kashmir. By J. F. Duthie. Calcutta, 1894. Size 9½ × 6½, pp. [24]. *Map.*

The tour described was made in 1893 from Rawal Pindi to Srinagar, and on to Islamabad, turning north from there to the Sind valley and east to Dras, turning then up the Kishenganga river, and proceeding to the Shersar lake.

India—Lushais. *J.S. Arts* **43** (1895): 167–188. **Shakespear.**

The Lushais and the land they live in. By Captain J. Shakespear. *Map.*

Malay Archipelago—Celebes. *Z. Ges. Erdk. Berlin* **29** (1894): 351–401. **Sarasin.**

Reiseberichte aus Celebes. Von Paul und Fritz Sarasin. Erster Bericht. *With Map.*

Malay Archipelago—Engano. **Modigliani.**

Un Viaggio ad Engano. Conferenza di Elio Modigliani. Atti del Primo Congresso Geografico Italiano tenuto in Genova, 1892. Vol. i. Genoa, 1894. Pp. 369–404. *With Map.*

Syria and Arabia. *Palestine Exploration, Q. Statement* (1895): 67–82. **Wright.**

Syria and Arabia. By A. G. Wright.

A study in historical geography, including an account of the formation of the provinces Syria and Arabia by the Romans, and the districts into which they were divided; and of the boundary-lines of Syria and Arabia, and the inscriptions which relate to them.

AFRICA.

Abyssinia. *B.S.G. Italiana* (3) 7 (1894): 841–886. **Cerroti.**

Il secondo viaggio in Abissinia del Mashcov (1891–1892). Versione dalla lingua russa, del socio cap. Ottavio Cerroti.

A translation of Mashkoff's description of his journey in the *Novoia Vremia.*

African Hygiene. **Murray.**

How to live in Tropical Africa: a Guide to Tropical Hygiene. The Malaria problem: the Cause, Prevention, and Cure of Malarial Fevers. By J. Murray, M.D. Maps and Climatological Memoranda by E. G. Ravenstein. London: G. Philip & Son, 1895. Size 7½ × 5½, pp. xii. and 252. *Maps and Illustrations. Price 5s. Presented by the Publishers.*

Dr. Murray has utilized his own experience in Africa, and the records of most other students of tropical hygiene, in the compilation of this book, which should prove of the greatest service to explorers and residents in tropical Africa. He dwells at most length on the cause, symptoms, and treatment of malarial fever, which he believes will cease to be a common disease in Africa as it has ceased to be an endemic disease in the English fens, and from the same cause—drainage and the extension of agriculture.

African Native Houses. *Globus* 66 (1894): 341–347, 360–365, 378–383. **Hösel.**

Dr. L. Hösel, Leipzig, Die rechteckigen Schrägdachhütten Mittelafrikas. *With Map and Illustrations.*

An account of the rectangular slope-roofed houses of Central Africa, their architecture and distribution.

British East Africa. **Gregory.**

Contributions to the Physical Geography of British East Africa. By J. W. Gregory. From the *Geographical Journal* for October, November, and December, 1894. Size 10 × 6½, pp. 64. *Map. Presented by the Author.*

British South Africa Company. ———

The British South Africa Company. Directors' Report and Accounts, March 31, 1894. Size 10½ × 8½, pp. 42. *Map.*

British West Africa—Lagos. *Annales G.* 4 (1895): 190–201. **Rouire.**

La Colonie de Lagos, et les Annexions récentes de l'Angleterre. Par Dr. Rouire.

British West Africa—Sierra Leone. **Parkes.**

Elementary Handbook of Geography of the Colony of Sierra Leone and its Hinterland. By J. C. Ernest Parkes. Freetown: printed at T. J. Sawyerr's Excelsior Printing Works, 1894. Size 7½ × 5, pp. 32. *Price 1s. Presented by the Author.*

A mass of compact geographical information is presented in this little pamphlet, for the most part in the form of question and answer. It has obviously been compiled with much care, and should prove extremely useful to all who have dealings with the colony.

Central Africa—Uganda. **Ashe.**

Chronicles of Uganda. By the Rev. R. P. Ashe. London: Hodder & Stoughton, 1894. Size 8½ × 6, pp. xiv. and 480. *Portraits and Illustrations. Price 7s. 6d. Presented by the Publishers.*

No one can write on Uganda with greater authority than Mr. Ashe, and his account of the history of that country from its discovery to the present time is of great value. It is written, of course, from the point of view of the Protestant missionary, and will be taken in conjunction with other works, by any student who may endeavour to follow in detail the development of East Africa.

Congo Free State. **Reeves.**

Johns Hopkins University Studies. Twelfth Series. XI., XII.—The International Beginnings of the Congo Free State. By Jesse Siddall Reeves, PH.D. Baltimore: The Johns Hopkins Press, 1894. Size 9¼ × 6, pp. 106. *Price 50 cents. Presented by the Johns Hopkins University.*

Dr. Reeves has produced a timely study of the origin of the Congo Free State, which supplies in a convenient form most of the facts of interest at the present moment, when the future of the State is under discussion, and the question of its annexation by Belgium in the foreground. There is a full and useful bibliography.

Congo State—Mobangi. *B.S.R. Belge G.* **18** (1894): 944–501. ———

Les rapides du Haut-Oubanghi. *With Maps.*

Contains extracts from M. G. C. Marinel's official reports, and maps of the rapids of Zongo, Belby, Elephants, Banzy, and Cetema, on the Mobangi river.

East Africa. *B.S.G. Italiana* (3) **7** (1894): 816–822. **Sacchi.**

I Fiumi Omo e Baro Secondo una Carta Abissina. Nota del socio Maurizio Sacchi. *With Facsimile.*

Discussion of a map drawn by an Abyssinian, and published in Cecchi's 'Da Zeila alle frontiere del Caffa,' which appears to show that the river Omo has no relation to Lake Rudolf.

Egypt—Nile. *B.S. Khédiv. G.* **4 S.** (1894): 163–203. **Ventre.**

Les Egyptiens connaissaient-ils la source de leur fleuve? Essai archéologique sur l'origine physique du Nil. Par F. Ventre Bey.

An investigation of the possible data for Ptolemy's assertion that the Nile rose from two large lakes a little beyond the equator on the slopes of the mountains of the Moon. This the author believes to have been a surviving tradition from the period of the XII. and XIII. dynasties, the period of the greatest territorial expansion of the domain of the Pharaohs along the river.

Eritrea. *B.S.G. Italiana* (3) **7** (1894): 774–788. **Ciccodicola.**

Escursione dall' Asmara a Mai Daro attraverso al Deca-Tesfà. Nota del capitano F. Ciccodicola. *Map and Illustrations.*

French West Africa—Dahomey. *Annales G.* **4** (1895): 166–189. **d'Albéca.**

L'avenir du Dahomey. Par M. A. L. d'Albéca. *With Map and Illustrations.*

This study of the future of Dahomey includes an excellent summary of its present state, particularly with regard to people, system of government, and trade. There are several good photographic illustrations.

French West Africa—Gaboon. **Buléon.**

Miss. Catholiques **26** (1894): 586, 596, 607, 619.

Excursion au pays des Eshiras. Par le R. P. Buléon. *With Map and Illustrations.*

German East Africa. **Seidel.**

Das Kisukuma. Grammatische Skizze nebst Kisukuma-Deutschem und Deutsch-Kisukuma Vokabularium. Von A. Seidel. Sonderdruck aus: Zum Victoria Nyanza v. Premierlieutenant W. Werther. Berlin: Gergonne & Co. [not dated, 1894?]. Size 9 × 6½, pp. 18. *Presented by the Author.*

Niger. *Annales G.* **4** (1895): 202–209. **Busson.**

Le régime du Niger. Par M. Henri Busson.

This is a study of the physical geography of the Niger, with regard more particularly to the dates and volumes of its floods.

Somaliland. **Candeo.**

Un viaggio nella penisola dei Somali. Conferenza di Giuseppe Candeo. Atti del Primo Congresso Geografico Italiano tenuto in Genova, 1892. Vol. i. Genoa, 1894. Pp. 349–367.

South Africa. *B.S.R. Belge G.* **18** (1894): 526–551. **Leclerc.**

La Golconde africaine. Par J. Leclerc.

A chapter from a forthcoming work, 'A Travers l'Afrique Australe,' describing a visit to Kimberley and the diamond-mines.

NORTH AMERICA.

Canada—Early Discovery. **Dawson.**

The Voyages of the Cabots in 1497 and 1498. With an attempt to determine their Landfall, and to identify their Island of St. John. By Samuel Edward Dawson. From the Transactions of the Royal Society of Canada, vol. xii. sect. ii., 1894. Montreal: W. Foster Brown & Co., 1894. Size 12 × 9, pp. 72. *Presented by the Author.*

A further note on this subject will appear.

Newfoundland and Labrador. *American J. Science* (3) 49 (1895): 86–94. **Wright.**

Observations upon the Glacial Phenomena of Newfoundland, Labrador, and Southern Greenland. By G. Frederick Wright.

The results of these observations will be noticed in the Monthly Record.

United States—Coast and Geodetic Survey. ———

Report of the Superintendent of the U.S. Coast and Geodetic Survey for the fiscal year ending June 30, 1892, in two parts. Part II.—Appendices relating to the Methods, Discussions, and Results of the Coast and Geodetic Survey. Washington: Government Printing Office, 1894. Size 9 × 6, pp. 552. *Maps and Illustrations. Presented by the Survey.*

United States—Massachusetts. **Crosby.**

Geology of the Boston Basin. By William O. Crosby. Vol. i. part ii.—Hingham. (Occasional Papers of the Boston Society of Natural History, IV.) Boston, 1894. Size 10 × 6, [pp. 110]. *Maps. Presented by the Boston Society of Natural History.*

United States—Massachusetts. **Marindin.**

On the changes in the ocean shore-lines of Nantucket Island, Massachusetts, from a comparison of surveys made in the years 1846 to 1887 and in 1891. A report by Henry L. Marindin. [From the U.S. Coast and Geodetic Survey Report for 1892. Part ii., pp. 243–252. *With plates.*]

An important memoir on coast erosion.

United States—Missouri. *T.A. Science St. Louis* 6 (1894): 481–517. **Updegraff.**

Determinations of the Latitude, Longitude, and Height above sea-level of the Laws Observatory of the University of the State of Missouri, containing a description of the building and principal instruments. By Milton Updegraff. *With Plate.*

SOUTH AMERICA.

Andes—Glaciers. *Globus* 67 (1895): 37–38. **Hauthal.**

Gletscherstudien aus der argentinischen Kordillere. Von Dr. Rudolf Hauthal.

Dr. Hauthal, the director of the geological section of the La Plata Museum, here gives notes of the glacial observations made on his geological survey of a portion of the Argentine Cordillera, between February and August, 1894.

Brazil—Amazons. **Leal.**

O Amazonas. Conferencia realisada na Sociedade de Geographia de Lisboa em 9 de Novembro de 1894. Pelo Dr. Oscár Leal. Lisbon, 1894. Size 7½ × 5½, pp. 66. *Presented by the Author.*

Brazil—Ceará. *Globus* 67 (1895): 33–35. **Ihering.**

Ceará und die Pläne zur Verbesserung seines Klimas. Von Dr. H. v. Ihering. S. Paulo.

Chile. *M.G. Ges. Wien* 37 (1894): 503–544. **Polakowsky.**

Die Entwicklung der Republiken Chile und Argentinien in den Jahren 1889 bis 1894. II. Chile. Von Dr. H. Polakowsky.

Ecuador. *Deutsche G. Blätter* 17 (1894): 265–289. **Eggers.**

Das Küstengebiet von Ecuador. Von Baron H. Eggers. *With Map.*

The map shows the annual isotherms, and distinguishes the arid regions from the regions of the Garuas, where rain falls.

Guatemala. **Sapper.**

Grundzüge der physikalischen Geographie von Guatemala. Von Dr. Carl Sapper. *With four Maps.* Gotha: Justus Perthes. Size 11 × 7½, pp. iv. and 60. *Price* 6 *m.* 40 *pf.*

The principal maps accompanying this memoir (Ergänzungsheft No. 113 of 'Petermann's Mitteilungen') are a fine contoured sheet on the scale of 1 : 900,000, showing the complete orography of Guatemala in colours, a geological map, and a vegetation map on the same scale. The memoir itself is a good example of the thorough systematic study of the physical geography of a whole country.

Paraguay. *Norske G.S. Aarbog* **5** (1893–1894): 25–27. **Storm.**

Reiser og opdagelser paa Pilcomayo-floden, af løitnant O. J. Storm. *With Map and Illustrations.*

Peru. *Deutsche Rundschau G.* **17** (1895): 145–155, 203–213. **Hübner.**

Vom Amazonenstrom nach der peruanischen Westküste. Von Georg Hübner in Manaos. *With Illustrations.*

AUSTRALASIA AND PACIFIC ISLANDS.

Marshall Islands—Jaluit. *M. Deutsch. Schutzgeb.* **7** (1894): 305–318. **Steinbach.**

Bemerkungen über das Klima von Jaluit. Nach Dr. Steinbach.

The observations on which this report is founded were made from December 1891 to June 1894.

New Caledonia. ———

Publications de l'Union Coloniale Française. Guide de l'Emigrant en Nouvelle-Calédonie. Paris: A. Challamel, 1894. Size 7½ × 5, pp. 124. *Map. Presented by the Union Coloniale Française.*

A pamphlet prepared in the hope of turning the current of French emigration from the South American republics to New Caledonia.

New Hebrides. **Beaune.**

La Terre Australe Inconnue. Onze croisières aux Nouvelles-Hébrides. Par Gaston Beaune. Lyon: Delhomme et Brignet [not dated, 1894]. Size 7½ by 5, pp. 300. *Map and Illustrations.*

M. Gaston Beaune is a young French naval officer who has made good use of his opportunities in visiting various islands of the New Hebrides, and gives also a connected account of the history and present conditions of the group.

New Zealand—Year-Book. **Dadelszen.**

The New Zealand Official Year-Book, 1894. . . . By E. J. von Dadelszen. Wellington, 1894. Size 8½ × 5½, pp. vi. and 567. *Maps and Diagrams.*

The present edition, in addition to the usual official statements and statistics, contains a number of special articles on the land-system of the colony, agriculture, mining, climate, alpine exploration, etc.

Solomon Islands. *Globus* **67** (1895): 6–12. **Seidel.**

Die natürlichen Kanäle auf den Salomo-Inseln. Von H. Seidel, Berlin. *With Maps.*

Maps and descriptions, compiled from the works of several travellers, of the narrow channels separating some of the members of the Solomon Islands.

POLAR REGIONS.

Antarctic. *Norske G.S. Aarbog* **5** (1893–1894): 115–131. **Larsen.**

Nogle optegnelser af sæl og hvalfanger "Jasons" reise i Sydishavet 1893 og 94, af Kapt. C. A. Larsen. *With Map.*

An abstract of Captain Larsen's log with map of his antarctic cruise is given in the *Journal* for 1894, vol. iv. p. 333.

Antarctic Researches. **Roncagle.**

Studio preliminare per una Stazione Geografica Italiana nelle regioni polari antartiche. Presentato al primo Congresso Geografico Italiano in Genova dal Tenente di vascello della Ris. Nav. Giovanni Roncagle. Atti del Primo Congresso Geografico Italiano tenuto in Genova, 1892. Vol. ii. part i. Genoa, 1894. Pp. 129–148.

Greenland. *J. of Geology* **2** (1894): 649–666. **Chamberlin.**

Glacial Studies in Greenland. By T. C. Chamberlin. *With Illustrations.*

This is the first of a series of articles on the glacial conditions of Greenland which Professor Chamberlin is to contribute to the *Journal of Geology*, describing the results of his last summer's voyage to the coast of Greenland.

Greenland. *G. Tidskrift* **12** (1893–94): 247–255. **Holm.**

Oprettelsen af Missions- og Handelsstationen Angmagsalik paa Grønlands Østkyst. Ved J. Holm, Kaptain i Flaaden. *With Map.*

A visit to the Danish stations on the east coast of Greenland.

NEW MAPS.

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EUROPE.

England and Wales. **Ordnance Survey.**

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Town Plans—5-feet scale:—

London (Revision), VI. 79, with houses stippled, 2*s.* 6*d.* each.

——— **10-feet scale**:—

London—Re-survey (Hornsey Parish), III. 45, 1, 3; III. 55, 3; III. 65, 2, 2*s.* 6*d.* each. Index 6*d.*

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Germany. **Lepsius.**

Geologische Karte des Deutschen Reichs, auf Grund der unter Dr. C. Vogels Redaktion in Justus Perthes' Geograph. Anstalt ausgeführten Karte in 27 Blättern bearbeitet von Dr. Richard Lepsius. Scale 1 : 500,000 or 7·6 stat. miles to an inch. Lieferung III. Sheets:—26, Augsburg; 27, München. Justus Perthes, Gotha, 1895. *Price* 3 *marks each part.*

The geological map of Germany is based on the topographical map in 27 sheets, by Dr. C. Vogel, and published by Justus Perthes of Gotha in 1891–93. It is, in fact, that map geologically coloured under the direction of Dr. Richard Lepsius. The colours are carefully chosen, and register well.

Germany. **German Government.**

Karte des Deutschen Reiches. Scale 1 : 100,000 or 1·51 stat. miles to an inch. Sheets:—140, Norden; 172, Emden; 188, Stargard i. Pom; 411, Muhlhausen i. Thrgn; 437, Gotha; 438, Erfurt. Herausgegeben von der Kartogr. Abtheilung der Königl. Preuss. Landes Aufnahme, 1894. *Price* 1·50 *mark each sheet.*

Switzerland. **Swiss Federal Staff.**

Topographischer Atlas der Schweiz im Masstab der Original-Aufnahmen, nach dem Bundesgesetze vom 18 Dezember 1868 durch das eidg.

topogr. Büreau gemäss den direktionen von Oberst Siegfried veröffentlicht. Scales 1 : 25,000 or 2·5 inches to a stat. mile, and 1 : 50,000 or 1·25 inches to a stat. mile. XLIII. Lieferung. Sheets:—209, Lowerz; 296, Thierrens; 303, Cassonay; 376, Pilatus; 386, Flühli; 387, Sörenberg; 388, Giswilerstock; 442, St. Cergue; 444, Crassier; 471, Tornettaz; 545, Mendrisio; 547, Chiasso. XLIV. Lieferung. Sheets:—262, Hinter Wäggithal; 283, Saint-Croix; 289, Bel Coster; 297 bis, Les Mines; 298, Le Brassus; 299, Le Sentier; 381, Brunnen; 431, Marchairuz; 538, Taverne; 544, Porto Ceresio; 546, Varese; 548, Val della Grotta. *Price* 1 *fr. per sheet. Presented by the Topographical Bureau, Swiss Federal Staff.*

ASIA.

India. **The 'Indian Engineer.'**

The *Indian Engineer* map of India, showing railways, canals, irrigation-works, rivers, etc. Published at the office of the *Indian Engineer* in Calcutta and London. Scale 1 : 1,900,800 or 30 stat. miles to an inch. Four sheets. *Price* 2*l.* 2*s.* unmounted, 3*l.* 3*s.* mounted. *Presented by Ernest Benedict, Esq., M. Inst. C.E., editor of the 'Indian Engineer.'*

This is a large wall-map of India, showing, in a remarkably clear manner, by different symbols, all the railways at present working, and those under construction and proposed, together with the gauges of the lines. Main roads and navigable rivers are indicated, the former being coloured yellow, and the latter blue. No hill-shading is given, and the map contains only the names of the more important places.

Nicaria Island. **Büchner.**

Die Insel Nikaria. Nach der Englischen Admiralitätskarte, mit Nachträgen und Verbesserungen von Dr. L. Büchner, 1892. Scale 1 : 150,000 or 2·4 stat. miles to an inch. Petermann's 'Geographische Mitteilungen,' Jahrgang 1894, Tafel 18. Gotha: Justus Perthes, 1894. *Presented by the Publisher.*

AFRICA.

East Africa. **Fischer.**

Karte der Gebiete von deutsch- und britisch-Ost-Afrika zwischen dem Victoria-Nyansa und dem Kenia. Mit Benutzung der Routen-Aufnahme Dr. G. A. Fischer's, nach dem neuesten Quellen gezeichnet von Dr. Bruno Hassenstein. Scale 1 : 750,000 or 12 stat. miles to an inch. Petermann's 'Geographische Mitteilungen,' Jahrgang 1895, Tafel 1. Gotha: Justus Perthes, 1895. *Presented by the Publisher.*

South Africa. **Donald Currie & Co.**

The Castle Line Atlas of South Africa. A series of 16 plates, printed in colours, containing 30 maps and diagrams. With an account of the geographical features, the climate, the mineral, and other resources, and the history of South Africa, and an Index of over 6000 names. London: Donald Currie & Co., 1895. *Price* 3*s.* 6*d.* *Presented by Messrs. Donald Currie & Co.*

To all who are interested in South Africa this will doubtless prove a very useful little atlas. The maps, which are prepared by Messrs. G. Philip & Son, are carefully brought up to date; and, in addition to those showing the general geographical features and political boundaries, there are others giving the location of the minerals and agricultural products, means of communication and mission stations, relief shown by shaded contours, the geology, rainfall, and ethnology. Enlarged plans are given, as insets, of the principal towns and gold-fields, and at the end there is a map of East Central Africa, including British Central Africa and Nyasaland.

The forty-seven pages of letterpress which precede the maps, contain a great deal of useful information for emigrants, sportsmen, and others who may be thinking of visiting South Africa. There is also a page, at the commencement of the atlas, giving a short description of the South African railways.

GENERAL.

German Colonies. **Langhans.**

Deutscher Colonial-Atlas, 30 Karten mit vielen hundert Nebenkarten, entworfen, bearbeitet und herausgegeben von Paul Langhans. Achte Lieferung Gotha: Justes Perthes, 1895. *Price* 1 *mark* 60 *pf. each part.*

This part contains maps Nos. 16 and 23 of the atlas, the former being the second sheet of a four-sheet map of German South-West Africa, and the latter a map of Australasia and Polynesia, showing the German possessions and settlements. In addition to the principal maps, various insets on enlarged scales are given.

World. **Kirchhoff and Herrich.**

Wandkarte des Weltverkehrs, Äquatorial-Massstab, 1 : 22,000,000 or 5° to an inch. Mit 4 Nebenkarten: Central-Amerika, Massstab 1 : 11,000,000; Nordsee und Kanal, Strasse von Suez und Strasse von Malakka, Massstab 1 : 4,400,000. Bearbeitet und Herrn Professor Dr. Alfred Kirchhoff gewidmet von A. Herrich. Glogau, Druck und Verlag von Carl Flemming, 1895. 4 sheets. *Price* 12 *marks*.

All the principal railways, steamship tracks, submarine and overland telegraph lines, navigable rivers and canals are clearly shown on this map, as well as political divisions, German consular stations, and other useful information. It is printed in colours in a bold style, and, as a general commercial wall map of the world, will doubtless be of service to many.

World. **Miller.**

Mappaemundi. Die ältesten Weltkarten, herausgegeben und erläutert von Dr. Konrad Miller. 1 Heft:—Die Weltkarte des Beatus (776 n. Chr.). Jos. Roth'sche Verlagshandlung Stuttgart, 1895. *Price* 5*s. each part.*

This is the first of a series of facsimile maps, of which others will follow in due course. It is printed in colours, and accompanied by full explanatory letterpress. According to a prospectus issued with this map, the following are the titles of those yet to appear:—

Heft 2.—Atlas von 16 Lichtdrucktafeln, ohne Text, enthaltend: 1, Die Psalterkarte von London; 2, Beatuskarte von Paris II.; 3, Beatuskarte von Osma; 4, Beatuskarte von Ashburnham; 5, Beatuskarte von Valladolid; 6, Beatuskarte von Madrid; 7, Beatuskarte von London; 8, Beatuskarte von Gerona; 9, Beatuskarte von Turin; 10, Beatuskarte von Paris III.; 11, (1) Karte des hl. Hieronymus; 12, (2) Karte des hl. Hieronymus; 13, Karte des Heinrich von Mainz; 14, Die Cottoniana; 15, 16, Karten des Ranulf Hygden. *Heft* 3.—Die kleineren Weltkarten: des hl. Hieronymus; des Heinrich von Mainz; die Cottoniana; die Psalterkarte; die Karte des Lambert von St. Omer; des Matthäus Parisius; des Ranulf Hygden; des Guido; die Sallustkarten und viele kleinere. *Heft* 4.—Die Herefordkarte. *Heft* 5.—Rekonstruierte Karten des 7, bis 1, Jahrhunderts n. Chr.: 1, Die Weltkarte des Ravennaten; 2, Die Weltkarte des Isidor von Sevilla; 3, Die Weltkarte des Orosius; 4, Sphaera Julii Honorii; 5, Die Fragmente des Romanus von Ammianus Marcellinus; 6, Das 1 Segment der Castorius-Karte; 7, Der Pinax Dionysii; 8, Die Weltkarte des Pomponius Mela; 9, Dimensuratio und Divisio.

When complete, these will doubtless form a most important series of reproductions, especially interesting to students of historical geography.

CHARTS.

Chile. **Oficina Hidrográfica, Chile.**

No. 48. Planos de la Costa de Chile: Ensenada Tames, 1 : 20,000. Caleta Lantaro, 1 : 10,000, 1894.—No. 49, Costas de Chile: Isla Mocha, 1 : 40,000, 1894. *Presented by the Chilian Hydrographic Office.*

North Pacific Ocean. **U.S. Hydrographic Office.**

Pilot Chart of the North Pacific Ocean. February, 1895. Published at the Hydrographic Office, Bureau of Navigation, Navy Department, Washington, D.C. Charles D. Sigsbee, Commander, United States Navy, Hydrographer. *Presented by the U.S. Hydrographic Office.*

PHOTOGRAPHS.

N.B.—It would greatly add to the value of the collection of Photographs which has been established in the Map Room, if all the Fellows of the Society who have taken photographs during their travels, would forward copies of them to the Map Curator, by whom they will be acknowledged. Should the donor have purchased the photographs, it will be useful for reference if the name of the photographer and his address are given.

The

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THE LUCHU ISLANDS AND THEIR INHABITANTS.*

By BASIL HALL CHAMBERLAIN, Emeritus Professor of Japanese and Philology in the Imperial University of Japan.

I. INTRODUCTORY REMARKS.

MOST educated persons are aware that the Pacific Ocean holds somewhere or other an island or islands called Luchu, and the more elderly may perhaps remember to have heard something of a British exploring expedition sent there early in the century. But being a place which the globe-trotter cannot reach with comfort, and which offers to men-of-war no inducements in the way of coal or good harbours, it receives scarcely any visits from Europeans, and there is probably to-day no part of the world equally civilized that is so little known. So completely, indeed, does Luchu lie out of the way, not only of travellers, but of book-makers, that after the lapse of three-quarters of a century Captain Basil Hall's work, entitled, 'Account of a Voyage of Discovery to the West of Corea and the Great Loo-choo Island,' and published by Murray in 1818, still remains the chief authority on the subject. At the time of my own visit in the spring of last year, the only European in the whole archipelago was the Abbé Ferrié, a French Catholic missionary, who, however, lived in the northern island of Oshima, which does not form part of Luchu in the narrower sense of the word; and the only occasional visitor (also to Oshima) was Mr. Alfred Unger, of the firm of Boehmer & Co., florists, of Yokohama. My own opportunities, though unfortunately not permitting of a visit to the smaller outlying isles, were excellent for seeing both land and people in Great Luchu, as the time of year favoured travel in that warm region, and letters of introduction from the Japanese Foreign Office threw open all official sources of information, while nothing could exceed the hospitality of the native aristocracy as soon as they learnt that their strange visitor was neither missionary nor merchant, and that he could speak Japanese, which is the French of those parts. These circumstances may perhaps justify a somewhat minute account of what I saw and heard. Many items have never been described before for European readers—the marriage customs, for instance, and the two systems of ideographs. The present paper will fulfil its object if it succeeds in showing that the Luchus are no mere barbarous islands, but that, on the contrary, they possess a complex civilization, an ancient and checkered history, and a language capable of throwing welcome light on Far-Eastern philology; that, in fact, these minute specks on the map expand when properly studied, and become as full of varied interest as a drop of water or an ant's brain when placed under the naturalist's microscope.

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* Paper read at the Royal Geographical Society, January 7, 1895. Map, p. 408.

My special thanks are due to Mr. Narabara, Governor of the archipelago; to Mr. Takeshita, late Chief Inspector of Police there; to Mr. Nishi, Mayor of Shuri; to the learned botanist, Mr. Tashiro, who has devoted years to a scientific exploration of the Further Isles; to Mr. Tamura, a Japanese planter resident in the island of Ishigaki; and to Mr. Alfred Unger, who has favoured me with several photographs. Mr. H. C. Litchfield, barrister, of Yokohama, placed in my hands the manuscript of an account of a visit to Luchu by the late Mr. H. Pryer; but unfortunately it was in too fragmentary a condition to make much use of, and contained scarcely anything on Mr. Pryer's special subject—lepidoptera—beyond an expression of disappointment with the specimens obtained.

II. Geography and Natural Characteristics.

Taken in its widest acceptation, Luchu is the name of the whole chain of islands stretching from the south-western extremity of Japan to near the north-eastern extremity of Formosa. Taken in its narrowest sense, it denotes only the central island, Great Luchu, or this island with its smallest immediate neighbours, while other names are applied to the other sub-groups of the archipelago. Historical considerations partly explain this ill-defined usage of the term, the limits of the recently extinguished Luchuan kingdom and the nature of the Japanese claims to some of the islands having varied from time to time, as will be seen in Section III. A further cause of confusion has been the habit common to European navigators of naming and re-naming islands and groups of islands more or less at pleasure, and of mixing up their own nomenclature with the native names imperfectly understood. If we are to take early history as our standard, the Luchu islands begin at the very mouth of the Gulf of Kagoshima, in southern Japan. Are popular customs and physical features to be our guides? Then Luchu begins only at Amami-Oshima. Shall we follow modern Japanese administrative parlance? Then the northern half of the archipelago must be omitted altogether, because incorporated centuries ago with Japan proper, and there remain only Great Luchu and the Further Isles. So arbitrary a question can never be satisfactorily settled, for it depends on a definition of terms which every one is free to define as he sees fit. Another moot point is, which of the islands shall be enumerated by name, and which omitted as too insignificant? Thirty-six is the number always given by Luchuans and Japanese alike, and it corresponds very fairly well with fact if the entire archipelago be included. When, however, the northern part of the archipelago is omitted, the orthodox number has to be made up by adding some of the very small islands to the list.

Taking the name "Luchu" in its widest sense for the purposes of this paper, and adopting the subdivisions familiar to Japanese geographers, we find that there are altogether thirty-six principal islands, which fall into six groups, as follows :—

I. *The North-Eastern Group*, accounted as belonging to the Japanese province of Osumi. It includes—

1. TANE-GA-SHIMA (*Tanega sima* of British Admiralty Chart, No. 2,412), long in shape—some 32 miles by 5—comparatively low (highest point 1,200 feet), and admirably cultivated with rice and other crops. This island is noted in history as the first point of Japanese, or quasi-Japanese, soil trodden by Europeans, the Portuguese adventurer Mendez Pinto having landed here in the year 1542, and astonished the natives so greatly by his firearms, that a pistol is still sometimes called a *tane-ga-shima* in colloquial Japanese. The population numbers over 23,000 (census of 1890).

2. MAKE-JIMA (*Mage no Sima* of the chart), a mere islet, used for raising a few cattle, and also resorted to by fishermen.

3. YAKU-NO-SHIMA (*Yakuno sima* of the chart), a circular island of some 15 miles diameter, covered with luxuriant forests, where grow the celebrated *yaku-sugi*, the variety of cryptomeria most prized for its timber. The knot of mountains forming this fine island attains a height of over 6000 feet, thus surpassing any peak on the mainland of southern Japan. Whether its origin be volcanic or not, like its mainland neighbours, has not yet been determined. The inhabitants, who number some 8,800, enjoy the reputation of an almost idyllic simplicity. Doors need neither locks nor bolts in this happy island, where theft is unknown; and a man hanging up his coat on a bush will be sure to find it untouched when next he passes by that way.

4. KUCHI-NO-ERABU-SHIMA (*Nagarobe* or *Yerabu* of the chart), 6 miles long by 5 broad, is an active volcano over 2,200 feet high.

II. *The North-Western Group*. This group, which is accounted part of the Japanese province of Satsuma, consists of three small islands, called—

5. TAKE-SHIMA (*Take Sima* of the chart), 740 feet high.

6. IWO-GA-SHIMA (*Iwoga Sima* of the chart), lit. "Sulphur Island."[*] The burnt red and yellow aspect of this island cone, rising over 2,300 feet sheer out of the sea, is most desolate; but the sulphur, which gives it its name, forms a valuable source of income.

7. KURO-SHIMA (*Kuro Sima* of the chart), 3 miles long by 2½ wide, and over 2,000 feet high.

III. The *Shichi-to*, lit. "Seven Isles"[†] ("Linschoten Islands" of the chart). These too are all very small, though mostly high, and some are active volcanoes. A few poor families manage to pick up a living even under circumstances so unfavourable; but this group, like the (Group) = II ~~last~~, lacks all practical importance. Its chief interest is the danger it offers to navigation. The names of the islands are—

8. KUCHI-NO-SHIMA (*Kutsino-sima* or *Yerabout*[‡] of the chart), 2,230 feet high.

9. GAJA-SHIMA or HEBI-SHIMA (*Hebi-sima* or *Dundas Island* of the chart), 1,687 feet.

10. NAKA-NO-SHIMA (*Naka-sima* or *Pinnacle* of the chart), 3,400 feet.

11. HIRA-SHIMA (*Fira-sima* or *Disaster* of the chart), 812 feet.

12. SUWA-NO-SE-JIMA (*Suwa-sima* or *Archimedes* of the chart), an active volcano, 2,706 feet high.

13. AKUISHI-JIMA (*Akuisi-sima* or *Samarang* of the chart), 1,978 feet.

14. TOKARA-SHIMA (*Tokara-sima* or *Pennell* of the chart), 860 feet.

15. YOKO-SHIMA (*Yoko-sima* or *Ogle* of the chart), 1,700 feet.

IV. *The Oshima Group*, originally subject to the Kings of Luchu, but conquered and incorporated with his domains by the Prince of Satsuma in 1610, and now under the jurisdiction of the Japanese Prefecture of Kagoshima. This group, sometimes also called *Shō-Ryūkyū*, that is, Small Luchu, consists of—

16. *Oshima*,[§] or more fully Amami-Oshima (*Anami Oö Sima* or *Harbour Island* of the chart[||]). This, the second largest member of the

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[*] The 'China Sea Directory' gives it the alternative name of "Volcano Island," reserving the name of "Sulphur Island" for one further to the south.

[†] There are really eight, but "Seven Isles" is a favourite number with the Japanese; take, for instance, the *Izu Shichi-to*, or "Seven Isles of Izu," to the south of Yokohama. With regard to the term "Linschoten Islands," the 'China Sea Directory' includes under it Tane-ga-shima, Make-jima, and Yaku-no-shima; but the chart writes the name so as to cover the Seven Isles (*Shichi-tō*) only.

[‡] Evidently by confusion with *Erabu-* (also written *Yerabu-*) *shima*. But whence the final *t*? Perhaps from some French mariner, who might naturally write the sound *abu* as *about*.

[§] Oshima, lit. "Big Island," is a name of perplexingly frequent recurrence off the Japanese coast. Hence the plan of prefixing some more definite appellation, to distinguish each particular Oshima from its homonyms. Thus we have *Izu no O-hima* (Vries Island), off the coast of the province of Izu, etc.

[||] Chart No. 873 spells *Amami* properly, and so does the 'China Sea Directory.' But all have *Oo Sima* for Oshima.

entire Luchuan archipelago, is some 30 miles long by 17 wide at the south-western end, which is the broadest part. It is a maze of hills, which rise in the south to over 2,000 feet; but none of them are volcanoes, and Oshima is said to be entirely free from earthquake shocks. Lying, as the island does, directly in the way of the *Kuroshiwo*, or Japanese Gulf Stream, the climate is excessively humid. Few days pass entirely without rain; and even when it is not actually raining, clouds and mist often obscure the sun. This state of things, disastrous in such a latitude (28° 20′) to European health, favours, as a hothouse might do, the growth of a luxuriant vegetation, amongst which cycads and tree-ferns most strike the eye. It likewise favours the propagation of many lower forms of animal life, especially the dreaded Trimeresurus snake, of which more later on. Naze, the chief port of Oshima, lies on the north-western side of the island. It is a very dull little place, built in Japanese style and boasting a Japanese inn. The native dialect, essentially Luchuan in character, has been overlaid by the Satsuma dialect of Japanese, and forms a patois in various stages of degradation and hybridism according as the speaker belongs to town or country. The population is 51,000.

17. Kakeroma-shima (*Kageroma Sima* of the chart) is a very narrow island some 12 miles long, plastered up, if one may so say, against the southern coast of Oshima, from which it is separated by a narrow channel known to English mariners as Oo-sima, or Porpoise Strait. It boasts several small ports of export, and its coasts are much resorted to by fishermen from Great Luchu. To its south lie the small but high islands of—

18. Yoro-shima (*Ioro Sima* of the chart), 1,000 feet; and

19. Uke-shima (*Uke Sima* of the chart), 1,353 feet.

20. Kikai-ga-shima or Kikai-jima (*Kikai-ga-sima* or *Bungalow Island* of the chart) is nearly 7 miles long by 2½ wide, and 864 feet high. It is almost timberless, so that the inhabitants, who number over 15,000, are driven to the use of horse and cow-dung for fuel. It is noted as producing the best sugar and the best mats (known as *Ryūkyū-omote*) in the whole archipelago. Popular superstition represents it as having anciently been the abode of demons, whence its name, which means literally "Demon World."

21. Toku-no-shima (*Kakirouma*,* *Tok-sima*, or *Crown Island* of the chart), 15 miles long by 9 broad, and 2,200 feet high. This island and the two to be next mentioned are well-wooded, and produce considerable quantities of sugar.

22. Oki-no-Erabu-shima (*Yerabu Sima* or *Oukin* † of the chart), 9½ miles long, from 2 to 5 miles wide, and 687 feet high.

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* Apparently by confusion with Kakeroma-shima.

† Apparently a corruption of the first three syllables of the real name.

23. Yoron-jima (*Yori-sima* or *Yuru Island* of the chart) is a roundish island about 3 miles in diameter, and over 400 feet high.

It has already been stated that Group I. forms part of the Japanese province of Osumi, and Group II. of the province of Satsuma. These ancient provinces are now united for administrative purposes in the single prefecture of Kagoshima, in which Groups III. and IV. are also included. The Central and Southern Groups (V. and VI.) about to be enumerated, that is, Luchu Proper and the Further Isles, have been erected into a separate prefecture called the *Okinawa Ken*.

V. *The Central Group*, or Luchu Proper, the chief member of which is—

24. Okinawa or Great Luchu. This, the largest and by far the most important island in the whole archipelago, has a length of 56 miles, with a breadth varying from 2 to 14 miles. It has, from the most ancient times, been divided into three parts called Kunchan, Nakagami, and Shimajiri. The first or northernmost of these (also popularly known by the name of Yambara) is rough and mountainous, rising to a height of some 1,500 feet, wooded in parts, in parts barren, and everywhere but sparsely inhabited, such inhabitants as there are being despised for their poverty and rough speech and manners by the natives of the central and southern provinces. These provinces—Nakagami and Shimajiri—consist of open rolling country with low hills in the centre, are admirably cultivated, and thickly populated. The streams here, as on the other islands, though numerous, are necessarily very short, the longest attaining to a length of only about 6 miles. There is a curious stalactitic cave at Futemma, 10 miles from Nafa. The three provinces of Great Luchu are subdivided into districts termed *magiri*, of which there are nine in Kunchan, eleven in Nakagami, and fifteen in Shimajiri, the highly civilized central and southern provinces being thus much more minutely subdivided than the barren northern moor and forest land. A like division into *magiri* obtains in all the islands formerly subject to the Luchuan kings. The term, though now unknown in Japan, is said to have been current in Satsuma in ancient days. The best harbour in Great Luchu is Unten (*Port Melville* of the British charts), on the north-west coast; but it is, so to say, wasted, because situated in a hilly district remote from the centres of population and trade. For this reason the Japanese steamers and most junks repair to Nafa (or Naha or Naba, as the Japanese sometimes pronounce it), in Shimajiri, near the southern extremity of the island, which is much less good, the inner harbour being only accessible at high tide. Close to Nafa, and indeed practically forming one with it, are the towns of Tomari and Kume-mura. Shuri, the capital (called Shui by the modern Luchuans, who habitually drop the *r* in the middle of words), crowns a hill some 400 feet high standing a little over three miles inland from Nafa. No other place in the archipelago approaches Shuri or Nafa in size, and the two form a

striking contrast, Nafa being a busy port, the seat of the Japanese administration, and altogether much Japonized in appearance and in the manners of its inhabitants, whereas Shuri remains quite old-world. The castle of Shuri is a delightfully picturesque relic of early days.

The other members of the Central Group, except Kume-jima, are small and quite unimportant. They are as follows:—

25. TORI-SHIMA or IWO-ZAN * (*Iwo sima* or *Sulphur Island* of the chart). This is a volcanic cone some 540 feet high, and still active. It is the southernmost volcanic member of the Luchuan archipelago.

26. IHIYA-JIMA (*Yebeya sima* of the chart), 7 miles long by nearly 2 wide, and 963 feet high.

27. IZENA-SHIMA (*Isena sima* of the chart), a mere islet 403 feet high. The British naval authorities unite these last two islands under the common name of *Montgomery Group.*

28. IE-SHIMA (*Iye Island* or *Sugarloaf* of the chart), 4½ miles long by 1¾ broad, and 575 feet high.

29. AKUNI-JIMA (*Agunyeh* of the chart), 3 miles long by 2 broad, and 300 feet high.

30. TONAKI-JIMA (*Tunashee* of the chart), a mere islet 603 feet high.

31. KERAMA-JIMA is a group, whose small detached eastern members are called Mae-jima (*Maikirima* of the chart) and Kuro-shima (*Korusima* or *Saddle Island* of the chart). The white cliffs of Mae-jima form a striking feature in the view seaward from Nafa and south-eastern Luchu generally. The large central island is called Tokashiki-jima, while the smaller western members are collectively known by the name of Nishi-Kerama, their individual names being respectively Zamami-jima, Yagahi-jima, Aka-shima, Kuba-shima, and Keruma-jima. The chart writes Yagahi as *Yakang*, Kuba as *Kupa*, and does not name Keruma at all. The island between Keruma on the south and Aka on the north seems to have no name even in Japanese, the three islands being in some mysterious way considered as only two. The 'China Sea Directory' includes all three under the general name of *Aka sima*. The principal village and anchorage of the Kerama Group is Ago-no-ura, in the island of Zamami.

32. KUME-JIMA (*Komisang* of the chart) is some 6 miles long, also 6 miles wide in the widest part, and has two peaks—a southern one 1,028 feet high, and a northern 1,108 feet high. It has a fine waterfall visible from the sea. This outlying but thickly populated little island is one of the most noted in the archipelago, owing to the *Ryukyu-tsumugi*, a silk fabric which is exported to Japan and much prized in that country. The principal village, called Kana-gusuku-hama, is situated on the south-western coast.

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* Though lying so far north as to seem more naturally included in the Oshima Group, this island is always accounted as forming one of the Central Group, because it belonged politically to Great Luchu.

VI. *The Saki-shima Group*, or "Further Isles." In the British Admiralty Charts 2,412 and 2,105 it is styled *Meiaco-sima* or *Yayeyama Group;* but both these designations are founded in misapprehension, Miyako-jima being really the individual name of the easternmost large island (*Taipinsan Island* of chart 2,412*) with its tiny satellites, while Yayeyama (or Yaeyama) is a general name for the two large western islands of Ishigaki-jima and Iri-omote-jima (*Pa-chung-san* and *Ku-kien-san* or *Nishiomote Sima* of the chart), with their satellites. Yonakuni-jima (*Kumi* of the chart†) stands alone. It may be added that Tai-pin-san, Pa-chung-san, and Ku-kien-san are Chinese names for the islands. The Saki-shima or Further Isles are enumerated as follows:—

33. MIYAKO-JIMA, 17 miles long by 5½ wide. It and its neighbouring islets are comparatively low, nowhere much exceeding 300 feet. They lack timber, but are thickly populated. Water is often scarce, and in the hollows where it is kept it goes up and down with the tide. The names of the islets are Ogami-jima (*Hummock Island* of the chart), Ikema-jima (*Coruma* of the chart), (Oku-no-) Erabu-shima (*Yerrabu* of the chart), Shimoji-shima, Kuruma-jima (*Kurimah* of the chart), and—some way further to the west—Minna-jima (*Mitsuna* of the chart), and Tarama-jima (*Tarara* of the chart). The British Admiralty chart names, as will be noticed, are more than usually faulty in the case of this sub-group. It will be observed, also, that the chart gives no name at all to Shimoji-shima, but makes the latter form one with Erabu-shima by omitting the extremely narrow channel between these twin islands, and that it thus causes what are really two to appear as one. The Japanese Admiralty chart, on the contrary, which dates made in 1885 from 1888, is very carefully executed. Miyako-jima was the first point of Luchuan land with which British mariners became acquainted, H.M.S. *Providence*, Captain Broughton, having been wrecked about a century ago on the great *Yayebise*, or Providence Reef, which stretches to the north of it. In 1863, the German ship *R. J. Robertson* also was wrecked on Miyako-jima; and a monument, raised on the spot by order of the Emperor William, commemorates the kindness with which the German mariners were rescued and then entertained for a whole month by the inhabitants. The name of the chief village is Karimata-Minato.

34. ISHIGAKI-JIMA.—As already stated, this island and the next, Iri-omote-jima, are together known under the collective designation of *Yayeyama*. Ishigaki, a very irregularly shaped island, might be defined as a clump from 6 to 7 miles in diameter, plus two narrow peninsulas, one 11 miles long running north-east, and another 4 miles long to the west. It has many hills and mountains, of which the highest is 1,680 feet high. The chief village, also called Ishigaki, stands on the south-

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* This and some of the other names are differently spelt in the other chart.

† Probably a mutilation of the second half of the name (*kuni*), which signifies "country."

west coast. The south in general, which is comparatively level, is highly cultivated with sugar, indigo, and other crops.

35. IRI-OMOTE-JIMA, 15½ miles long by 12 wide, is very mountainous, some points close to the coast reaching a height of 1000 and even 1,300 feet, while the interior, for the most part covered with a dense growth of tangled forest, is still imperfectly explored. The chief village is called Sonai; but Iri-omote is less well peopled than its neighbours. The odious climate—with its constant downpours and violent alternations of temperature—and the rotting of timber in sluggish streams and morasses doubtless contribute to this result by producing dreadful malarial fevers, which the Luchuans call *fuchi*. The mountain recesses are for this reason viewed with well-founded dread, few that have spent a night in them escaping the scourge. The working of coal, which, though of poor quality, promised to become a profitable industry in Japanese hands, and was for a short time exported to Hongkong, has had to be practically abandoned in consequence of the alarming mortality among the miners. The difficult nature of the interior causes communication between the various villages to take place chiefly by boat along the coast. Horses, however, are also in constant use. Wild boars exist in great numbers, also pigeons, fowls, and pigs; and what with rice and fish of various kinds, the bill of fare in these Further Isles leaves even less to be desired than in Great Luchu.

Besides the large islands of Ishigaki-jima and Iri-omote-jima, the Yayeyama subgroup includes the islets of Taketomi-jima (*Roberton* of the chart), Kobama-jima (*Koubah* of the chart), Kuro-shima (*Raugh* of the chart, *Baugh* of the 'China Sea Directory'), Kami-banare-jima, or Kami-jima for short (*Inglefield* of the chart), Shimo-banare-jima or Shimo-jima (*Loney* of the chart), Haderuma-jima (*Sandy Island* or *Hasyokan* of the chart), which is the most southern of all the Luchus, and Hatoma-jima (*Isaac* of the chart). None of these islets attain to any height. All are inhabited.

36. Separate and westernmost of all the Luchu islands is YONAKUNI-JIMA (*Kumi* of the chart), 6 miles long by 2 broad, about 700 feet high, and well populated. The chief village is called Sonai (same name as that of the principal village on Iri-omote-jima). This island produces sandal-wood, mulberry, persimmon, and other valuable timber-trees. It is said that from here, on a clear night, lights are sometimes visible on the Formosan coast. Perhaps, however, only lights *off* the coast, such as those of fishing-boats that have come unusually far out from shore, are meant. None of the Further Isles have any decent harbours.

Such, in its widest extent, is the Luchuan Archipelago. The following is the official census of the various islands,[*] taken on December 31, 1891:—

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[*] *I.e.* of such as are included in the Okinawa Prefecture.

	Divisions.	Number of houses.	Population.
Great Luchu.	Nafa and neighbourhood	9,872	39,627
	Shuri	5,206	25,880
	Shimajiri	18,825	93,968
	Nakagami	21,633	115,695
	Kunchan	15,189	80,271
	Kume-jima	1,275	5,453
	Miyako-jima	7,157	34,926
	Yaeyama-jima and Yonakuni	3,320	15,061
	Total	82,477	410,881

NOTE.—Nafa proper contains 7,726 houses, with a population of 26,896.

STATISTICS OF CLASSES.

December 31, 1891.

Princes.		Nobility and gentry.		Common people.		Total.	
Householders.	Family.	Householders.	Family.	Householders.	Family.	Householders.	Family.
2	35	22,567	95,082	57,981	235,213	80,550	330,330

NOTE.—Besides these, there was one foundling not included in any class.

The large proportion of the nobility and gentry as compared with the lower classes forms a curious feature in these statistics; but there is, I believe, no doubt of the exactness of the calculation.

With regard to the geological formation of the various islands of the chain, it has already been stated incidentally that many are of volcanic origin—some, indeed, still active volcanoes belching forth smoke and producing sulphur. These may be regarded as outlying members of the Kyushu line of volcanoes in southern Japan. Tane-ga-shima is not of volcanic origin, and Yaku-no-shima not certainly so. Oshima is stated by Mr. Kada Tei-ichi, who examined its geology, to be composed chiefly of metamorphic rock; but in the smaller islets to the south of Oshima, volcanic agencies still display themselves sporadically. Great Luchu and its satellites show us a totally different formation—coral reefs everywhere on the seaboard, and coralline limestone together with metamorphic rocks. Marble is found in the neighbourhood of Untens. The Further Isles to the south-west are different again, the coral along the coasts being succeeded in the interior by granite and other rocks not yet determined, except so far as that some of them have been found to be of volcanic origin. Coal likewise, as already stated, occur in Iri-omote-jima—a thing utterly unknown in the northern members of the group. The coral reefs round the Further Isles, especially to the north of Miyako-jima, and again between Ishigaki and Iri-omote, are of great extent, and make navigation in those waters unusually perilous.

Turning now to the animal life of the archipelago, we find horses, cows, pigs, goats, dogs, and cats everywhere in a state of domestication, and small wild boar and small wild deer on the principal islands. The cattle too are small, and the horses—or rather ponies—remarkably so, the majority being only from 10½ to 11 hands high, and some as little as 10 hands; but they are wiry and extraordinarily sure-footed. Two species of rats exist—the house rat and another smelling strongly of musk—and two or three species of bat, including the large fruit-bat, *Pteropus dasymallus*, which has been ascertained to be peculiar to these islands.* The mammal most conspicuous in Luchu by its absence is the monkey. This fact strikes one the more on account of the wide distribution of the monkey in Japan, where it ranges as far north as the extreme north of the main island, despite months of snow and ice. Luchu also has no foxes or badgers—a lucky deliverance in the opinion of Far-Eastern Asiatics, by whom these animals are universally credited with supernatural powers for evil.

Of birds some fifty species are known, including the *Erithacus komadori* (called *aka-hige* by the Japanese), ascertained by Mr. Pryer to be peculiar to these islands.† The reptilia include at least three species of frogs, one of which is a very large green tree-frog, and a salamander resembling the common Japanese species, except that it is yellow on the belly instead of red. A pretty green lacertula is common on Okinawa, as is also a chameleon. There are some harmless snakes, besides the poisonous Trimeresurus. The latter, called *habu* by the natives, is 4 or 5 feet long by 2 inches in diameter, and is an object of universal fear and hatred. In Okinawa, indeed, one rarely meets with it except in the forests of the north, and the islands of Kerama, Oki-no-Erabu-shima, and Kikai-ga-shima are said to be quite free of it; but in Oshima and Toku-no-shima it is ubiquitous. Not only does this dreaded reptile spring out at passers-by from the hedges, where its habits lead it to lie in wait for birds; it actually enters houses, making it perilous during the warm season to walk about the house at night except with a lantern. A letter from the Abbé Ferrié, dated June 1, 1893, informs me that since my visit to him at the end of March five persons had already been bitten that season, of whom three had died. No antidote is known. The general result of such cases as do not end in death is lifelong crippling. Pecuniary rewards are offered by the authorities for the bodies of these snakes, dead or alive, and the villagers go out into the woods to secure them. Even so the number of the *habu* does not seem to diminish perceptibly, and there is at least one case within recent years of a village having been abandoned by its inhabitants because they could not cope with their dire reptilian foes. The species has been named *Trimeresurus ryukyuanus* by Mr. Pryer, and is, I believe, peculiar to the Luchuan archipelago. Several of the Luchu islands also produce sea-snakes, locally known as *Erabu-unagi*, lit. "Erabu eels," and which, though all lumped together by the natives, really belong to at least three distinct species. Most are harmless, but of one species the bite is poisonous. Of the commonest species the females are about 4 feet long and 9 or 10 inches round, the males about 2½ feet long; the females having a white belly and rings on the back, while the males have reddish bellies. A second and less common sort is somewhat larger, sometimes as much as 5 feet long; the belly reddish, with white, green, and black bands. All these can be easily caught in a depth of about 7 fathoms. The poisonous species is still larger, running to as much as 8 feet. Like vipers in some of the rural districts of Japan, these Luchuan sea-snakes are highly prized, being consumed as food by the rich, and in smaller quantities as medicine by the poor. They are smoked alive by being tied round and round a stick and placed at a suitable distance above a fire. They become nearly black in the process of smoking, and at first sight look like short black sticks to one viewing them in the Nafa market, where they are commonly exposed for sale.

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* The late Mr. Pryer, in the manuscript referred to on page 290, says, "Wallace, in his 'Island Life,' gives this bat as one of the animals peculiar to Japan; but it must be erased from the list, as it cannot be said to be found north of Luchu." (Mr. Wallace gives it as a native of Kyūshū, the southernmost of the large islands forming Japan proper.)

† He says, in the manuscript already quoted, "This bird was originally described from Japan upon specimens obtained by Von Siebold, who unfortunately transposed the native name, which should be *akahige*, giving this name to the *komadori*, and calling the *komadori akahigi*. . . . It is a ground bird, and its song very sweet. I have often seen specimens in the shops of Yokohama and Tokio, and, in answer to my inquiries, have been told that they came from Korea, which is very improbable, as a long price was always asked for them, and they are very susceptible to cold, and very unsuited to stand such an inclement climate as Korea. It is now definitely ascertained that they are natives of Luchu, where they are most probably residents, and do not extend further north, as Mr. Namie, of the Educational Museum, found them in March."

Land-shells are abundant, and the waves cast up on the sea-beach a varied and beautiful assortment of marine shells. The coast waters swarm with fish, most of which, however, make but poor eating—at least, to one fresh from Japan.

The late Mr. Pryer, who visited Okinawa chiefly in quest of Lepidoptera, expresses disappointment at the results obtained, as all the specimens were either of world-wide distribution, or at least common in Japan or in Malaysia. He seems, however, to have examined only the butterflies, and even these but during a short visit in the month of May. The moths, I believe, have never been worked at all, though I was told of a monster bombyx peculiar to the furthermost isle of Yonakuni-jima. The paucity of insect life during my own visit early in the spring was remarkable. No mosquitoes had yet ventured out. Perhaps the open nature of the country in Southern Okinawa and the constant sea-breezes prove as adverse to insect life as they are beneficial to human beings.

*Unlike the fauna, the flora diverges very widely from that of Japan, over half the species being different. About thirty per cent. of the whole are subtropical species, recalling Formosa and the Fuchau province; about twenty per cent. are tropical, including waifs and strays from such distant regions as Australia. Several kinds of live oak and pine grow in the forests of the north of Great Luchu; but though these trees are also common in Japan, the species differ. Bamboos are much rarer than in Japan, and such as occur are chiefly of a different species—probably *Bambusa vulgaris*. A banyan (*Ficus retusa*) impresses a peculiarly Indian character on the scene, and the *Heritiera littoralis* and *Tournefortia argentea*, which attain large dimensions all along the coast, lend an equally southern aspect. One feature which at once strikes the eye, is the enormous quantity of cycads growing everywhere on the hills and in waste places. They are pressed into service as an article of food, on account of the sort of sago to be got from the tree's pith. The pandanus and a large cactus (called *bōra* by the natives) are used as hedges, the latter being planted on the walls round the houses. There are several palms, many ferns, and tree-ferns. The bird's-nest fern grows to a large size both on the ground and in the trees, and there are several kinds of orchids. The white lily (*Lilium longiflorum*) grows wild. A ginger with fine yellow flowers is common, as are agaves, both of the striped and plain forms, and an immense species of arum. Two species of banana grow on the islands, one (*Musa Chinensis*)—the edible species—being comparatively scarce, while the *Musa textilis*, which is used to weave cloth out of, is very abundant. Among other cultivated plants may be mentioned sugar-cane, which is the great island staple of commerce, sweet potatoes, tobacco, indigo of excellent quality, pumpkins and many others of the gourd family, Indian corn, beans, monster radishes, and various cereals. The marvellous industry of the inhabitants makes them lay out in rice-fields every tiniest nook of land capable of irrigation, even down to the very brink of the sea. Three rice-crops are generally harvested every two years, the plan being to let the ground lie fallow during the fourth half-yearly period. Of the sweet potato, as many as five crops are raised in two years. This invaluable plant, now the staple food of the people, was only introduced here from Southern China in the year 1605, for which reason it is called *Kara-mmu*, that is, "the Chinese potato." From Luchu it was carried north to the Japanese province of Satsuma, where it is accordingly known as the "Luchuan potato;" and thence it spread to Central and Eastern Japan, where the people call it *Satsuma-imo*, from a mistaken impression of its being indigenous to that province. Native historians inform us that it was acclimatized in Luchu and passed into common use within the short period of four years after its first introduction. [illegible]

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* Much of the information contained in this paragraph came to me from Mr. Y. Tashiro, who has compiled a catalogue of Luchu plants, but intends visiting the archipelago once more before publishing it. He was a pupil of the celebrated Professor Maximowicz.

Meteorological observations are quite a recent institution in Luchu, having been started by the Japanese authorities at Nafa in the latter half of 1890, and being still confined to that single station. I insert an abstract of the statistics for 1891, the last published at the time of my visit. Statistics for a single year do not perhaps count for much, even if no doubt exists as to their accuracy, and the following table is given only for what it may be worth. It will be seen that the maximum in August is 33° 7′ Centigrade (92·66° Fahr.); and the minimum in January, 7° 4′ Centigrade (45·32° Fahr.).

NAFA OBSERVATORY, 1891, LAT. 26° 13′ N., LONG. 127° 41′ E.

(Centigrade and millimetres.)

	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Year.
Mean temperature	15·7	16·8	17·2	19·9	22·7	24·2	27·8	27·5	26·9	24 6	20·5	17·9	21·8
Mean maxima ...	19·6	19·8	20·2	23·5	26·3	27·4	31·7	31·4	30·4	29·0	24·0	21·5	25·4
Mean minima ...	12·2	14·0	14·3	16·8	19·9	21·9	24·9	24·7	24·1	21·1	17·5	15·0	18·9
Absolute maxima	25·1	25·8	25·3	27·9	29·4	31·4	33·0	33·7	32·7	30·6	28·8	26·1	33·7
Absolute minima	7·4	8·7	9·4	9·6	15·9	18·1	22·0	23·0	21·3	18 9	13·8	10·4	7·4
Total rainfall ...	35·2	169·3	195·6	516·1	454·8	113·7	217·3	421·8	280·9	31·0	98·5	64·3	2598·5
Number of rainy days...	15	21	21	17	24	16	16	16	26	9	16	17	214
Mean barometer (reduced to freezing-point)... ...	765·0	764·6	762·9	761·0	758·0	755·4	756·5	757·0	756·0	760·2	763·7	766·7	760·6
Mean direction of wind ...	N 39° E	N 20° E	N 42° E	N 73° E	S 48° E	S 46° E	S 17° E	S 43° E	S 56° E	N 45° E	N 49° E	N 51° E	N 81° E
Mean intensity of wind ...	42%	26%	47%	26%	33%	35%	61	50%	37%	44%	78%	63%	33%

As in Eastern Asia generally, so here also, speaking broadly, the winter is the dry season, while the late spring and summer form the wettest season; but the distinction is less marked than on the mainland of China or even in Japan. Speaking broadly, too, the climate of Great Luchu is a pleasant and salubrious one notwithstanding its moistness, the insular character of the place softening down all extremes of heat and cold. During March, 1893, the daily variation of the thermometer at Nafa was singularly small, never more than 7° Fahr., sometimes barely 1°; and the differences from day to day were likewise slight, varying in a whole month only between 56° and 72°. Also there was almost always an invigorating breeze. Captain Basil Hall and Dr. McLeod, who were there in September and October, and Commodore Perry, who was there off and on during the summer, speak equally highly of the pleasant climate and air of this fortunate isle.

Some of the other members of the archipelago, as already mentioned incidentally, are less favoured in this respect, notably Oshima and Iriomote-jima, with their dampness prevalent throughout the year.

Things are so bad in Iri-omote in this respect as to have given rise to a local proverb to the effect that it rains *thirty-five days a month!* The deplorable unhealthiness of this island, an unhealthiness which partly extends to its eastern neighbour Ishigaki-jima, has been already dwelt on. January and February are the rainiest months in all the Further Isles; October, November, and December the driest and least unhealthy; June and July those in which malarial fever is most prevalent. All the Luchus suffer severely from those typhoons which, brewing in the neighbourhood of Formosa or the Philippines, sweep up with such destructive fury towards the south-eastern coast of Japan.

My rides about the southern half of Great Luchu were extremely pleasant. The openness of the country, which in many places allows the ocean to be seen on either side, with colours deliciously varying according to the depth of the water above the coral reefs; the fresh sea-breezes; the alternation of hill and dale; the marvellous cultivation; the picturesque blocks of coral, standing up like ruined castles scarcely distinguishable from the real ruined castles that bear witness to a former less settled state of society; the happy-looking groups of labourers in the fields, all diligent and all most courteous when addressed;—these things made up a scene which it would be hard to match for quiet charm.

It is a curious fact, which I do not remember to have seen anywhere noted, that in the Japanese archipelago the vegetation diminishes, instead of increasing, in rankness as one travels south. Ride about Yezo during the summer months, and the grasses and tall coarse weeds are higher than your head as you sit on horseback. Central Japan does not carry things to such an extreme, the grass on the hills in summer being rarely much taller than a man on foot. In Great Luchu everything is much lower still. There are no tall grasses, comparatively few bamboos, few thickets of any sort. The country is park-like; and the hills, too, being lower than those of Japan and comprising no volcanic cones, but being rather gentle slopes carpeted with turf, the general effect is something closely approaching to typical English scenery. The early naval visitors to Luchu all remarked this, and went into raptures over it. For my own part, while granting the tranquil and, so to say, civilized charm of the scenery of Luchu, I do not think that it will bear comparison for a moment with the grander, more soul-stirring beauty of Japan—Japan volcano-guarded, snow-crowned, and flower-strewn, where cones, as graceful as they are treacherous, alternate with rich smiling plains and rugged granite peaks never trodden but by the foot of the hardy hunter in pursuit of the antelope or the wild boar. Luchu has none of these strong contrasts. It is all dimpled and pretty and on a small scale; there is no excitement in it. When I had left Nafa and was steaming up the Gulf of Kagoshima, at whose entrance the magnificent cone called the Fuji of Satsuma keeps guard, while another volcano smokes lazily ahead, I felt as if I had said good-bye to some pretty dairymaid, and were now re-entering the presence of an empress.

III. History and Racial Characteristics.

Luchuan historians, nothing daunted, carry back the annals of their country over a period of more than eighteen thousand years; but as the books containing this so-called ancient history are barely two centuries old, Chinese and Japanese writers still remain our earliest sources of information regarding the little archipelago. As soon as the obviously mythological period is left behind, all three sources agree pretty well together, though allowance must be made for the tendency of both Chinese and Japanese so to interpret ancient events as to justify their later claims to over-lordship. Even the Japanese investigators of the present day, though more or less scientifically trained in Western methods, have not succeeded in shaking themselves free from patriotic bias.

According, then, to the orthodox account, heaven, earth, and man were all originally in a state of chaos and confusion. At length, however, Luchu emerged, and through the beneficent activity of a god and goddess named respectively Shiniriku and Amamiku, the rocks and soil were formed, trees and herbs planted, and bounds set to the ocean, so that mankind, who had hitherto lurked in caves or forests and had herded with wild beasts, were able to come forth and multiply. This god and goddess had three sons and two daughters. The eldest son, Tinsunshi, that is literally, the "Heavenly Grandson," became the first king of Luchu; the second, called Anshi, became the first nobleman, his liege; while the third was the first husbandman. Thus these three celestial brothers originated the three classes of society. Of the two daughters, one is the patron goddess of all females of noble birth, the other of all peasant-women. At this time there were no books, for writing had not yet been invented. Days were counted only by observing the phases of the moon, and seasons determined by the budding and withering of the leaves. Rice even had hitherto been unknown, the people feeding on berries and the flesh of birds and beasts But Tinsunshi taught them both how to grow rice and how to cook it. He likewise divided the island into three parts, called Kunchan, Nakagami, and Shimajiri, and these three parts each into districts (*magiri*), which divisions have remained ever since unaltered. Moreover, he built the royal castle at Shuri. His dynasty lasted 17,800 years, coming to an end at last in the twelfth century of the Christian era, as we shall see later on.

The earliest foreign mention of Luchu (the historian does not state which of the islands he means) is contained in the Chinese annals of the year 605 of the Christian era, where we read of an attempt to find out something about the land and its inhabitants, which failed through want of interpreters. But soon after, an interpreter having been obtained by courtesy of the Japanese, an embassy was despatched to demand peremptorily the submission of the king to the Chinese emperor. Such submission being refused, an army was next sent in 611, the king's castle was burnt, and many thousands of men and women were carried away captive. This Chinese account, as will be noticed, is both circumstantial and plausible, and is probably a true one of *some* attack on *some* island in the Eastern sea. But which island? That is the question. A thousand years later, when Luchuan history was first put into writing, when Great Luchu had risen into paramount importance, and the name "Luchu" had become more or less confined to it, people seem to have assumed without further inquiry that Great Luchu was the place meant. In my opinion this assumption should not be so easily accepted without clear proof. Japan knew nothing of Great Luchu in the seventh century; yet we hear of the Japanese Court supplying interpreters. It is, therefore, at least possible that one of the northern islands, which were then called Luchu by the Japanese, was intended, or (if we give up the Japanese interpreter detail) that Formosa is intended; for a portion of that island, much nearer to China and far more likely to be attacked by the Chinese, was also anciently known to the latter under the name of Luchu. The former hypothesis does least violence to the text of the Chinese historian. Indeed, it does it no violence at all; but in the absence of further evidence, the question remains an

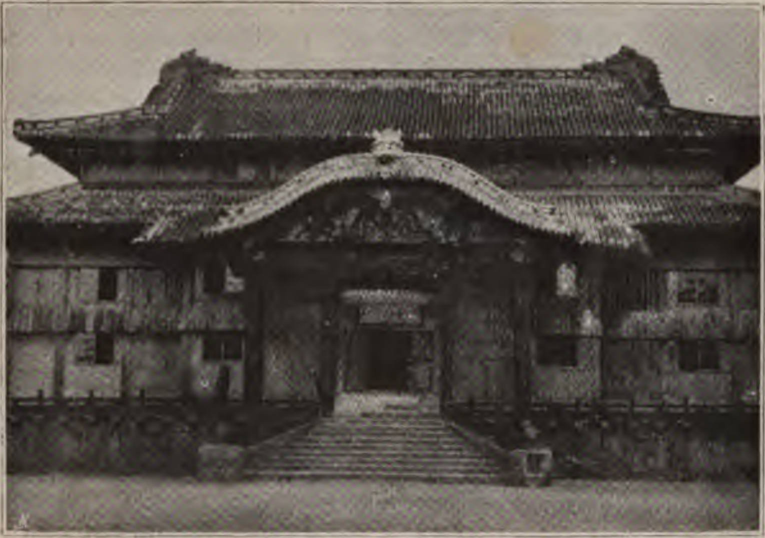

FIG. 1.—PALACE (SHURI).

obscure one. In any case, be the incident of the Chinese raid on Luchu true or false, it led to nothing; for many centuries passed before intercourse—at least official intercourse, whether warlike or diplomatic—was renewed, though some slight mutual knowledge seems to have been slowly developed during the Middle Ages, thanks to a trade which gradually sprang up between Luchu and the Chinese of the neighbourhood of Foochow, as the junk sailors became bolder and ventured further afield.

Intercourse between Luchu and Japan followed an altogether different course. All through the early Japanese annals, from the seventh century onwards, we find scattered mentions of the little archipelago—first of the northernmost islands, and then gradually of those further south. Sometimes the precise name of the island is given, sometimes the term *Ryukyu* (Luchu) is used rather vaguely, leaving us in doubt as to which island is intended. The first opening up of intercourse, we are told, was in A.D. 617, when three men of Yaku-no-shima came with gifts to the Japanese empress Suiko. This was a few years after Japan had begun to civilize and centralize herself on Chinese models. The people of Tane-ga-shima followed suit in A.D. 678; and in the following year a Japanese envoy returned the visit, and conferred Japanese rank on the native chieftain, reaching home in 680 with a map of this "Luchuan Island," and an account of the wonderful biennial rice-crops for which it is still famous. Not only Yaku-no-shima and Tane-ga-shima, but Amami-Oshima, became fiefs of Japan by the beginning of the eighth century; and we hear of tribute from Kume-jima, which may vaguely mean any of the southern islands, a little later. No notice of Kikai-ga-shima appears till the year 1001, when we are told that there was war with "Western barbarians" (?), whom the Kikai officials received orders from the Japanese to repel. We also learn during the next century (about A.D. 1179) of Shimazu, Prince of Satsuma, being charged by the Mikado's government with the superintendence of Luchuan affairs—that is, the affairs of Tane-ga-shima, Yaku-no-shima, and Oshima. This, being interpreted, means that he had managed to obtain a hold on these islands for his own advantage, and, in order to legalize it, sought the Imperial sanction, which was then a purely nominal and ornamental thing. There also exist notices of a Japanese re-conquest of Oshima by warriors of the Taira clan after their expulsion from Japan proper at the end of the twelfth century.

And now we make a jump southwards across the long and stormy stretch of water separating Oshima from Great Luchu. The Japanese hero, Tametomo, a scion of the great house of Minamoto, descended from emperors, and famed for his personal prowess with the bow, having been exiled by his enemies of the rival Taira clan, passed down the northern members of the Luchuan group, conquering each island as he went. Having encountered a great storm, his sailors were sorely affrighted. But Tametomo said, "Our fate is in the hands of Heaven; fear not for your lives!" wherefore the port at which they soon after landed was named *Un-ten*, that is, "fate heaven"—the Port Melville of our English charts. Tametomo was hospitably entertained by the local chieftain, whose sister made him father of a boy named Shunten; but as he was ever anxious to return home to Japan, he, with his Luchuan wife, twice essayed the voyage, being on each occasion driven back by dreadful tempests. The sailors suggested that the sea-gods disapproved of a woman being in the same ship with men. So Tametomo bade his wife remain behind and bring up their boy, whereupon he sailed back to Japan, and was seen no more in Great Luchu.

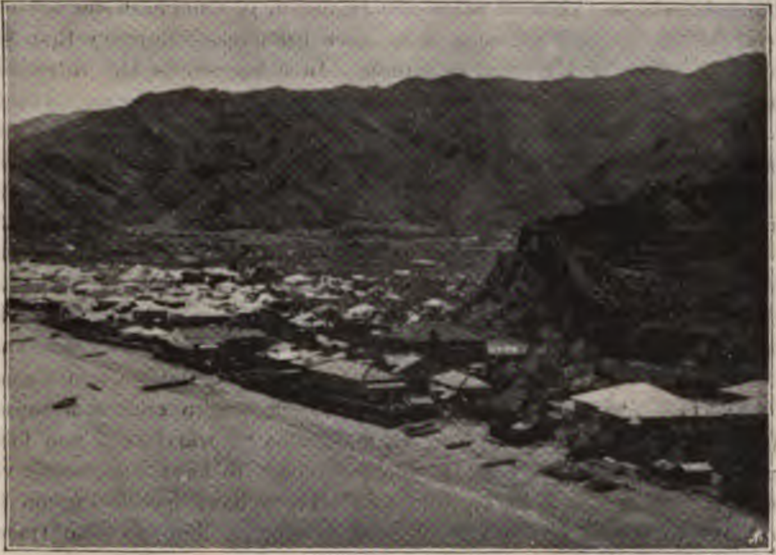

FIG. 2.—NASE, THE PORT OF OSHIMA.

Shunten, the son of Tametomo and of his noble Luchuan wife, is represented as the Napoleon of Luchu. Seventeen thousand eight hundred years had elapsed since the time of Tinsunshi, son of the god Shiniriku and the goddess Amamiku, during which period twenty-five immensely long-lived monarchs had successively filled the throne. This very *ancien régime* had at last become effete; the government of the twenty-fifth king was as weak in effect as it was tyrannical in intention; rebellion, confusion, and usurpation were rife on every side. Shunten found himself compelled gradually to assume the direction of affairs if only to restore order—first as chief of Urazoe (which, by the way, is rather suspiciously far from Unten), afterwards of all Central Luchu, and lastly of the whole island (A.D. 1187), which he ruled in such

couldn't d
what it ha
to do

She is as good as she is pretty

[illegible]

fashion that peace and prosperity prevailed. Among the other civilizing agencies which he introduced, the Japanese syllabary is specially mentioned. From him, according to the received account, the dynasty which has ever since claimed the throne of Luchu as its heritage is lineally descended, though I cannot make out from the history-books that this dynasty actually governed the island in undisputed and continuous succession. On the contrary, there seem to have been frequent troubles, sometimes accompanied by the election of a monarch from among the people. These troubles began already in the time of Shunten's grandson, —famines, pestilence, and other calamities showing clearly the wrath of the gods, and producing popular discontent which caused him to abdicate; and as this abdication was in favour of a noble of the ancient royal family, we may presume it to have been less voluntary than the native annalists would have us believe. In other words, the intruding Japanese kings were set aside, and the legitimate Luchuan dynasty was restored. But again, in the third generation, rebellion broke out, and the Luchuan realm, with which Oshima had been formally incorporated about A.D. 1270, was rent in pieces. This period, which is known as the Period of the Three Kingdoms, lasted from A.D. 1314 to 1429, from which latter time forward Luchu formed one realm, enlarged by the annexation of the Further Isles, whose loss of independence seems attributable to internal feuds among the various local chieftains. Till then the very existence of these islands had been unknown, or at least unheeded, by the Luchuans proper, though the population would seem to have been formed of waifs and strays from Luchu and from Japan. Graves are still pointed out on Ishigaki-jima of warriors whom local tradition represents as clad in what we know to have been mediæval Japanese costume. Yonakuni-jima is said to have had living on it, previous to its annexation by Luchu, seventeen families who traced their descent to the great but unfortunate Japanese Taira clan, and graves on several of the Further Isles have yielded finds of *magatama*, the comma-shaped ornament characteristic of proto-historic Japan.

Thus by the beginning of the fifteenth century the Luchuan kingdom had attained its widest extent, and ranked as an imperial power, at least in its own eyes. Governors were charged with the administration of each conquered island, Luchuan institutions and customs were established there, heavy tribute was levied, and the conquered were not allowed to resort to the metropolis, the only exception to this rule being that, if a Luchuan official had no other male heir than one born to him by a native woman during his term of service beyond seas, such child—but not its brothers and sisters, and never in any case the mother—might accompany him back to Luchu. Even under this restriction, several of the proudest Luchuan families are said to owe their origin to despised colonials. Nevertheless, discontents continued to arise both in the north and in the south; nor was the real social and political unification of the whole archipelago under Luchuan rule established till about the year 1520, under King Shoshin.

Meantime foreign troubles were brewing. China, which under Kublai Khan had recently failed in an attempt to conquer Japan, determined to add at least Luchu to her empire. Accordingly, in A.D. 1372 an envoy was sent to demand the submission of the legitimate Luchuan king, which was granted—an example followed almost immediately by the two smaller rebel states, with the result that Chinese ideas, hitherto sparingly received, poured into the country wholesale. Noble Luchuan youths were sent to study in China, and numbers of Chinese families were transplanted to Luchu. To Chinese diplomatic pressure may perhaps be traced the reunion of the three Luchuan kingdoms under one head, the great king Sho Hasshi. This monarch's tolerance of Chinese dictation was rewarded by many favours, pecuniary and other, including the grant of the surname Sho (尙), *i.e.* "Venerable," which his royal line still bears. The castle of Omono-Gusuku, on an island in Nafa harbour, was set apart as a "concession" or "factory" for Chinese traders, just as the Japanese set Deshima apart at Nagasaki for the Dutch at a later date; and in the wake of trade, there followed a notable development of the resources of the archipelago. The building of temples, fortresses, and royal pleasure-houses, the coming and going of ambassadors with numerous retinues, negotiations regarding commercial facilities, voyages as far as Canton and even Malacca—such, together with an occasional rebellion in one or other of the smaller subject islands, are the matters which the native annals now record. The good offices of the Luchuan kings were sometimes even called in to negotiate between China and Japan—a somewhat perilous honour.

Meanwhile Japan had not been blind to the growing prosperity of Luchu, and more than one prominent Japanese clan had endeavoured to acquire a share in that monopoly of Luchuan trade which old custom and Imperial sanction had vested in the Prince of Satsuma. But the latter was determined not only to keep what he had, but to get more. The refusal of the Luchuan king to help in the Japanese conquest of Korea by Hideyoshi (A.D. 1592–8) was made the excuse for picking a quarrel. It smouldered for some years; but at last in 1609, Shimazu, Prince of Satsuma, sent his general, Kabayama Hisataka, with a hundred warships and over three thousand soldiers, who first subdued Oshima, Toku-no-Shima, and Erabu-shima, and then landed at Unten, as Tametomo had done four and a half centuries before. Great Luchu was conquered after a resistance of forty days, the palace sacked, and the king carried off to Kagoshima, where, however, he was treated with great respect—rather as an unwilling guest, to amuse whom all sorts of entertainments were provided, than as a prisoner of war. Thence he was conducted to Yedo to do homage to the Shogun, who treated him right royally, as did the Daimyos of all the provinces through which he passed on his way back. But the interval of two years which thus elapsed was cunningly availed of by the Prince of Satsuma to reorganize the administration of the northern islands and to explore the southern ones by means of emissaries, who assessed the tribute there at rates which have lasted to our own day. The arrangement finally agreed on, after much talk and much judicious flattery of the captive monarch, was that Oshima and the other northern members of the archipelago should remain the exclusive property of Satsuma, but that the rest should be given back to the Luchuan king on condition of his paying a suitable yearly tribute and admitting at his court a Japanese political agent, who was to exercise supervision over the foreign affairs of the kingdom. This Japanese official or his subordinates, disguised in Luchuan dress, took part, unknown to the foreigners themselves, in all the interviews which, at a later period, the representatives of western nations had with the rulers of Luchu. Nevertheless, the payment of tribute to China was not vetoed, though all goings and comings between China and Luchu were jealously watched. We even find it recorded that in A.D. 1631 the Prince of Satsuma, happening to need money, caused a retainer of his, named Ijichi, to travel to Foochow with the Luchuan traders, disguised as one of them, and that, the profit thus earned having been very considerable, the practice was afterwards repeated every year.

By this time the Luchuan polity had crystallized into the form which it ever after continued to wear. Next to the king, who bore the title of *Usu-ganashī-mē*, came the *Oji* or royal kindred, the *Anzu*, and *Sanzukwan*,—these together forming the higher nobility entitled to wear gold hair-pins in their topknot. To them succeeded the *Wekata* (*Oyakata* in the Japanese pronunciation), wearing silver hair-pins ornamented with gold flowers, and ranking as a lesser nobility. The gentry, who were distinguished by the use of silver hair-pins, were divided into three classes, called *Pechin*, *Satunushi*, and *Chikudung*. The commoners, called *Nya*, wore hair-pins of brass. Hereditary titles and official rank were kept distinct, though, as was but natural, the nobility and gentry formed the governing class, the prime minister being always selected from among the king's near relatives. In some most important respects the country really deserved the title bestowed upon it by a Chinese emperor in 1579, and still proudly inscribed on the gate of its capital city, the title of "The Land of Propriety." There were no lethal weapons in Luchu, no feudal factions, few if any crimes of violence. Order was strictly preserved, and authority duly reverenced. Nominally severe (being based on Chinese precedent), the penal laws were mild in practice. Class and family considerations entered, however, largely into their execution. For instance, an assault on an elder relative was more heavily punished than one on a younger; and similarly when the rank of assaulter and assaulted differed. Not only were offences punished, but conspicuous virtue and successful efforts for the public weal were rewarded. Confucius' ideal was carried out—a government purely civil, at once absolute and patriarchal, resting not on any armed force, but on the theory that subjects owe unqualified obedience to their rulers, the monarchy surrounded by a large cultured class of men of birth, and the whole supported by an industrious peasantry. Trade occupied a very subordinate place; indeed, it scarcely rose above barter.

To European eyes, accustomed as they are to seeing things done on a large scale, Luchuan political arrangements would doubtless have seemed to partake of an *opéra comique* character. The number of the nobles was out of all proportion large, and the list of public offices and officers fairly takes away one's breath. A Council of State, Departments Financial, Foreign, and Ceremonial, Emergency Departments, Boards of Agriculture, of Tribute, of Woods and Forests, Offices for the Control of the Royal Pantry and the Royal Stables, a Censor's Office, a Herald's Office, Offices for the Control of Tribute to China and Japan, an Office for Famine Prevention by the Planting of Cycads, an Office for the Control of the Manufacture of Tiles for the Roofs of Houses, Offices for the Control of Lacquer, of Vegetable Wax, of Sugar, in fact of every important article of export,—all these existed, and crowds of others, besides governors and subordinate officials of various minutely graded ranks for the outlying islands. In reading of it and thinking of the number of officials necessary for the manning of departments, boards, and offices so numerous, one almost begins to wonder whether there could have been any population left to govern. On the *contra* side, too, it must be remembered that the agricultural class had nothing of what we call liberty, and few rights save that to live and work for their superiors. Still, taking all in all, the land was prosperous, and the items mentioned by the annalists show that even progress, though slow, was real; for the general assertion may safely be hazarded that Oriental stagnation exists only in Occidental fancy. We read of new plants, new manufactures (*e.g.* that of porcelain from Japan), and new medical methods being introduced as time went on. Some slight knowledge was likewise gained of the existence of foreign countries other than China and Japan, by the visits of European vessels which began at the end of the eighteenth century. Father Gaubil, a French Jesuit resident in China, had translated and published in vol. xxiii. of the *Lettres Edifiantes* (A.D. 1781), a Chinese account of Great Luchu and its inhabitants; and soon afterwards British ships began to appear in these waters. The shipwreck of H.M.S. *Providence*, Captain Broughton, on the large reef to the north of Miyako-jima, and the kind treatment which the shipwrecked mariners experienced both on Miyako-jima itself and at Nafa, whither they managed to make their way, drew the attention of the British naval authorities to this remote corner of the world. Accordingly, at the conclusion of the Napoleonic wars, it was determined to fit out an expedition to explore and roughly survey this and other little-known portions of the East Asiatic seaboard. H.M.S. *Lyra*, commanded by Captain Murray Maxwell, and H.M.S. *Alceste*, commanded by Captain Basil Hall, reached Nafa in September, 1816, and remained there and in the neighbourhood for six weeks. The British navigators established the most friendly personal relations with the natives, and worked away to right good purpose, not only in surveying and chart-making, but in questioning, observing, and investigating generally. Captain Basil Hall's account of this visit was the first European book on Luchu by an eye-witness of its customs. One of the British seamen having died, he was buried in a tomb supplied by the Luchuan Government at Amikudera, a shady spot on the seaside about two-thirds of a mile from Nafa. I was taken to see it, and found still legible the inscription in which the British commander recorded his sense of the favours received from "the king and inhabitants of this most hospitable island." By a curious irony of fate, the only part of the inscription no longer to be read is the name of the poor fellow whose memory it was intended to perpetuate. Since then, several other European seamen have been laid to rest in the same spot.

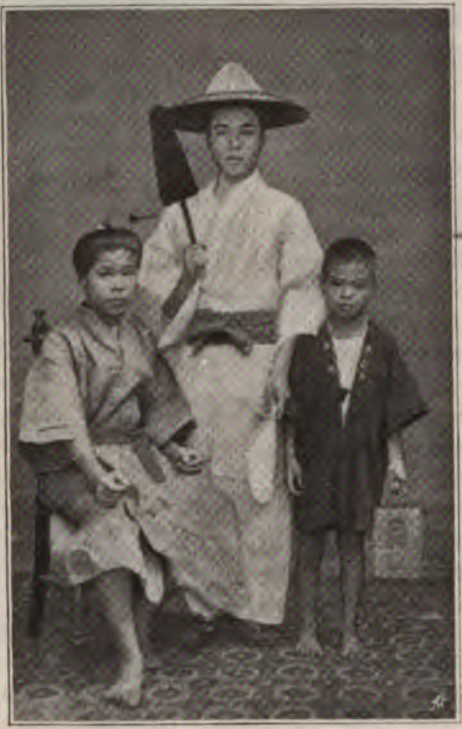

FIG. 3.—COMMON PEOPLE OF NAFA.

From that time forward the archipelago was visited occasionally by ships of various nations; for instance, in 1826 by Captain Beechey commanding H.M.S. *Blossom*, in 1844 by a French vessel which vainly endeavoured to open up a trade, and in 1845 by the British captain, Sir Edward Belcher, R.N., who surveyed some of the Further Isles. No diplomatic intercourse, however, was established, as the Luchuans, following their model China, always wished to avoid permanent relations with foreigners, though willing to treat with humanity and courtesy those whom accident brought as occasional visitors to their shores. They disapproved altogether of certain persons who came to stay.

These unwelcome guests were some French Catholic missionaries, of whom the earliest landed at Nafa in 1844, and a converted Anglo-German Jew named Bettelheim, who arrived as Protestant missionary in 1846. The Luchuans housed the foreign intruders, who persisted in remaining despite frequent entreaties to depart, but heeded their preaching so little that at last, after several years, both Catholics and Protestant, having convinced themselves of the uselessness of further persistence, left the island of their own accord. Meantime, far more redoubtable intruders than a few unprotected preachers of the gospel had arrived. One fine day in 1853 the American squadron under Commodore Perry, which was on its way to force open Japan, arrived at Nafa with the object of first forcing open Luchu. The weaker party of course went to the wall, the Americans established a coaling-station at Nafa, paraded the island, insisted on being received by the king, and terrified the inhabitants generally. The gain to knowledge was, however, considerable, and the *Journal* of the expedition is highly entertaining reading. Though a treaty was concluded, providing for the good treatment of American ships—a treaty which the French copied in 1855, and the Dutch in 1859—no permanent political result followed on Perry's expedition so far as Luchu was concerned, and the little island kingdom relapsed into its former seclusion. The interest of the place, to missionaries and diplomats alike, had centred in its position as a stepping-stone to Japan. With Japan itself open, all *raison d'être* for troubling about Luchu came to an end.

treaty provided

matter of her relations

Leaving Luchu's relations with Europe and America, we must now go back a little to take up the more important thread of her relations with her nearer Asiatic neighbours. Politically speaking, Luchuan history for several centuries consisted in an attempt to sit on both sides of the fence, and from this attempt has arisen in our own day the so-called "Luchuan Question," which has caused many heart-burnings to Far-Eastern diplomats. With China on the one hand and Japan on the other, the kinglet of Luchu was driven into being a sort of Mr. Facing-Both-Ways; and the whole nation more or less, or at any rate the higher official class, came to have a double set of manners—one for use *vis-à-vis* the first of its inconveniently big neighbours, the other *vis-à-vis* the second. Thus the Japanese copper "cash," with which of late some of the commercial transactions of life had been carried on in the absence of any native money,[*] were always carefully kept out of sight when the Chinese officials were by to see. On the other hand, the Chinese year-names commonly current in Luchu were ignored as far as possible in diplomatic intercourse with Japan. Even in matters of food, the poor little Luchuans tried to make themselves all things to all men. It is, however, easy to see that of the two patrons China was their favourite, notwithstanding the fact that Japan was more nearly allied by race. Their system of government, as has already been noticed, followed the Chinese civil, not the Japanese military type; and they always, among themselves, employed the Chinese calendar, which to Far-Easterns is a matter of the deepest import. Humiliating memories of the Japanese conquest in 1609, and the unwelcome presence since then of Japanese political agents doubtless contributed to this result. The Chinese over-lordship, on the other hand, was rather nominal than real, and the so-called tribute-ships despatched annually to Fuchau did such good strokes of business under the rose, that the Luchuans actually requested to be allowed to send *more* tribute to China than the amount originally stipulated!

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[*] The Luchuan Government more than once moved for the establishment of a native coinage, but the Japanese would not consent to this.

Thus, for over two centuries and a half, did Luchu continue to own a double allegiance—an arrangement which, in the then state of things, with scanty communication and hazy notions of international law, worked fairly to the satisfaction of all three parties concerned. A sudden change was brought about by the opening of Japan in 1853. Japan, forced by the Western powers from her long seclusion, adopted, with singularly clever foresight, the Darwinian tactics of "protection by mimicry." She herself became a Western power, or at any rate an excellent imitation of one; and, as we all know, one of the ways in which Western powers display their superior civilization is by annexing territory and tolerating nothing but complete, undivided submission on the part of the annexed. Accordingly, in 1872, the Luchuan ambassadors who had come to congratulate the Mikado on his resumption of the functions of government, found changes more far-reaching than they had expected. They were informed that Luchu should henceforth be cared for by the Japanese Foreign Office, and that the Luchuan king was to account himself a member of the Japanese nobility. When, a few months later, it was further announced that the Imperial Government took over the responsibility of the treaties previously concluded by Luchu with the United States, France, and Holland; when, in 1874, Luchu was placed under the control of the Japanese *Home* Office; when finally, in addition to these more or less sentimental grievances, the Luchuans learnt that an edict issued at Tokio strictly forbade their sending any more tribute ships—in other words, trading-ships—to Fuchau, it is no matter for surprise that the little court of Shuri was thrown into paroxysms of fear and impotent rage. A new embassy, which had taken up its residence at Tokio in 1873, exhausted itself in efforts to obtain Japanese sanction to the double suzerainty theretofore existing. Japan, so they pleaded, was their father, but China was their mother; and how could so tender an infant as Luchu survive without the fostering care of both parents? I believe that they even endeavoured to persuade the representatives of some of the foreign powers resident in Tokio to take up their cause. But *De minimis non curat diplomatia;* Luchu was too insignificant to be worth listening to. The end of it all was that the ex-king was brought as a guest, or in other words a state prisoner, to Tokio, where he still resides at the *Ryukyu Yashiki*, or "Luchu Mansion," no longer as a majesty or royal highness, but as a Japanese duke. His former domains have been annexed to the Japanese empire—annexed politically, and also partially assimilated bureaucratically under the name of the Prefecture of Okinawa, which is administered by Japanese officials, the provisions of Japanese law being carried out subject to various prudent exceptions which local needs and the circumstances attending a state of transition dictate. For instance, the Luchuans are exempted from the conscription. They are also exempted from the franchise, which should perhaps be to them a still livelier cause for gratitude, seeing the discord which that gift has fomented in Japan proper. Be this as it may, one thing is certain—no other nation to whom the Luchuans could possibly be subject would have granted the franchise to them, and equally certain that they would never have granted it to themselves.

Taking all things into consideration, more especially the gentle, yielding disposition of the islanders, it is probable that a few generations will suffice to obliterate all salient distinction between annexers and annexed. For my own part, and without pretending to any skill in political science, I view such a consummation as most desirable. Not that I would adopt that shallow argument for annexation which is reiterated as commonly in Japan as it is in Europe—the argument based on kinship of race and language. According to such a method of reasoning, England ought to be annexed to the United States, which (as the geometers say) is absurd. Indeed, does not all history teach us—to say nothing of private experience—that the bitterest quarrels are those between people of the same kith and kin? and is not the chief advantage of a common language the facility which it affords for wounding and exasperating each other's feelings? Nationality consists in the possession of a common past, and the desire for a common future. It is, therefore, not on any such *doctrinaire* grounds as that of racial and linguistic kinship that the hope to see Luchu form an integral and contented part of the Japanese empire can be founded. This hope is founded simply on the gradual recognition of expediency on the part of the islanders. At present there is still a conservative or nationalist party, which looks back fondly to the old days of independence. I believe, however, that, as its members die off, they will not be replaced by younger ones holding the same views, but that, on the contrary, all classes in Luchu will realize for their future guidance a fact which the Luchuan rulers themselves constantly harped on in their dealings with foreign powers—the helplessness and insignificance of their country. Luchu is very small and very weak. In these days of ubiquitous men-of-war, it is impossible for a very small and weak state to continue independent. The sole choice lies between masters. Now, Japan is surely a better mistress than China, and must be a more sympathetic one than any European power could possibly be. She gives roads, schools, a convenient currency, sure protection to life and property. The aspect of the streets of Nafa to-day, compared with Mr. Gubbins's description written but thirteen years ago,* shows that Japanese influence has greatly increased trade—the very point concerning which the Luchuans were most fearful. Japan enforces no religious or social crotchets, and permits no foreign commercial intercourse, so that the people of Luchu need fear neither any violent attempt to subvert their habits of life and thought, nor any unequal contest with a race stronger and craftier than themselves. On the other hand, such Luchuans as care to enter the lists, to learn Japanese and dress like the Japanese, may obtain official employment on equal terms with the Japanese, there being no prejudice of race or colour to relegate them permanently to a subordinate position. In short, from every point of view, frank acceptance of incorporation with Japan appears to be the method by which the Luchuans may best secure comfort and relative importance in the future.

To turn back a moment before quitting the subject of Luchuan history, it may be useful to remark that from the fourteenth century onwards, the Luchuan annals are evidently authentic. All before that—even the conquest by Tametomo—I hesitate to accept without better confirmation than seems to be forthcoming; but interesting evidence of genuineness of another kind comes before us in the general similarity of spirit that subsists between the Luchuan fabulous early history and that of Japan. The legend of the Creator and Creatress, and the immensely long divine dynasty that preceded the rule of purely human kings, have quite a Japanese ring.

My own conjectural restoration of the illegible pages of the early history of this remote region would be somewhat to the following effect:—that the common ancestors of the present Japanese and Luchuan nations entered Japan from the south-west, crossing the Korean Channel with the island of Tsushima as a stepping-stone, and landing in Kyushu, the southernmost great island of Japan. This is rendered probable alike by geography, by the trend of legend, and by the grammatical affinities connecting Japanese and Luchuan with Korean and Mongol. We know from history and from the testimony of place-names † that this race gradually spread eastward and northward, apparently amalgamating with some comparatively civilized native tribes as to whose affinities nothing can now be ascertained, but driving before it and killing off an earlier savage race, of whom the modern Ainos are the last remnant. A glance at a map will show why, as Kyushu filled up, the bulk of the invaders pressed east and north:—there was most land in that direction. There was also, however, some little land to the south, namely, the Luchu Islands, dotted like stepping-stones, visible one from the other, the whole way from the Gulf of Kagoshima to Great Luchu. The extremely close relationship subsisting between the Japanese and Luchuans, both as regards language and as regards racial type, forces one to the conclusion that a fraction of the intruding race took the southern route, perhaps from choice, more probably as a refuge from defeat in internecine strife. I should imagine further that there was not originally any thought of the subjection of the Luchuan archipelago as a whole to the Japanese empire, the very idea of such extended units being impossible before the days of centralization, and there being no trace of such a claim in the official Japanese annals when interpreted in their obvious sense; that wave succeeded wave at varying intervals, each successive wave of southward-bound emigrants subduing and partly incorporating those that had preceded it, because the men from the larger and more turbulent land to the north, where resources and all the elements of civilization were more abundant, would naturally overcome the weak, isolated islanders; that the legendary conquest by Tametomo preserves for us under a single name the vague native recollections of many such occurrences in the distant past; and that the historical conquest of part of the group by the Prince of Satsuma in the seventeenth century, and the recent formal annexation of the whole archipelago by the Imperial Japanese Government, show us the *modus operandi* of this southward movement under modern conditions, when improved communication and greater political power facilitate action on a larger scale. We thus see, too, why it is difficult to define Luchu exactly: the reason is that the degree of "Japonization" of the archipelago has varied from time to time, and that if we are to take language and customs as our guides, it is by no means easy to say in each case whether similarity between Luchu and Japan arises from original identity or from borrowing, or whether, on the other hand, differences should be ascribed to original unlikeness, or to the fact of one or other country having preserved intact features of the common past which the other has let drop.

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* See an excellent paper, entitled "Notes Regarding the Principality of Luchu," by J. H. Gubbins, of H.B.M. Legation, Tokio, printed in the *Journal of the Society of Arts*, June 3, 1881.

† See a monograph by the present writer on "The Language, Mythology, and Geographical Nomenclature of Japan viewed in the Light of Aino Studies," published as No. I. of the *Memoirs* of the Literature College of the Imperial University of Japan, Tokio, 1887.

Whether the predecessors of the Japano-Luchuan race in Luchu were Ainos or not, it is impossible to say. Two place-names have been adduced by a Japanese savant, Mr. Kada Tei-ichi, in support of such a theory; but that seems very little to build on.* Far more important

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* The names are *Sonai* and *Hinai* on the far-distant island of Yonakuni. *Nai*, which means "stream" in Aino, enters into the formation of numerous place-names in

[illegible]

is the discovery by Dr. Doederlein in Oshima of numerous hairy individuals among the smooth general mass of the population. I noticed none such myself, even among the fishermen. But Dr. Doederlein expressly says that he saw many quite as hirsute on the body and limbs as the hairiest Europeans; and his stay on that island having been longer than mine, and at a time of year (August) when a greater proportion of the labouring men would go naked, he is probably correct. Should the fact be really established, it would lend some countenance to the idea that a little Aino blood may yet survive in this outlying place, for we know of no intermixture with Europeans that might have produced a like result.

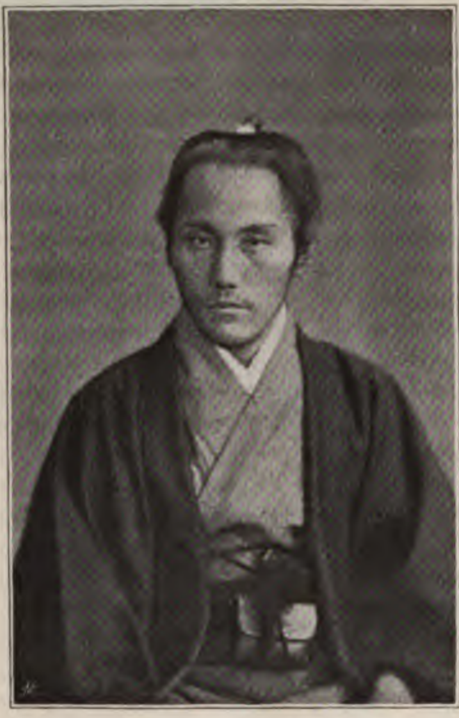

FIG. 4.—A LUCHUAN GENTLEMAN.

With these sporadic exceptions, the physical type of the Luchuans resembles that of the Japanese almost to identity, as is universally admitted by the Japanese themselves, who ought surely to possess a keener eye for minor differences between Mongolian and Mongolian than any foreigner can hope to have, and who do possess, as a matter of fact, a very keen eye indeed for detecting the inferiority of other Asiatics to themselves. Myself and my highly intelligent Japanese travelling companion were impressed in the same way, and I would venture to suggest that the peculiarities noticed by Dr. Guillemard * arose principally from differences of dress, coiffure, and shaving.

The Japanese type having been described once for all in Dr. E. Baelz's admirable monograph, entitled "Die Körperlichen Eigenschaften der Japaner," printed in Parts 28 and 32 of the *Mittheilungen der Deutschen Gesellschaft für Natur- und Völkerkunde Ostasiens*, nothing more need be said about it here. The most prominent race-characteristic of the Luchuans is not a physical, but a moral one. It is their gentleness

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Yezo, where the Ainos still flourish, and also in northern Japan, whence they were driven less than a thousand years age. There is also a *Sonai* on Iri-omote-jima.

* See p. 27 of his delightful 'Cruise of the Marchesa.'

(ago?)

of spirit and manner, their yielding and submissive disposition, their hospitality and kindness, their aversion to violence and crime. Every visitor has come away with the same favourable impression—Captain Broughton, whom they treated so hospitably on the occasion of his shipwreck in 1797; Captain Basil Hall, Dr. McLeod, Dr. Guillemard—even the missionaries, poor as was their success, and all the Japanese. For myself, I met with nothing but kindness from high and low alike. The solitary exception to this chorus of praise is Commodore Perry; but then the account he himself gives of his haughty and masterful conduct, of his violent threats, and contemptuous disregard of all international law and courtesy, renders it scant matter for surprise that even Luchuan patience should have been exhausted, and that the islanders should have resorted to deceit, which is the only weapon the weak have at their disposal against the strong. The blustering Commodore's virtuous indignation at the employment of this weapon against no less august a personage than himself, makes most amusing reading by reason of its unconscious satire.

deceit

against [illegible]
against [illegible]

Though the Luchuans do not impress one as a vigorous race, I noticed no cripples among them, nor yet any blind people. The only deformity that seemed somewhat common was hare-lip. Obesity was extremely rare.

(*To be continued.*)

The map of the Luchu Islands is a reduction from Japanese Admiralty Chart. The names have been translated from the Japanese by Mr. Basil Hall Chamberlain.

A JOURNEY TO TAFILET.*

By WALTER B. HARRIS.

On Wednesday, November 1, 1893, I left Morocco City with a small band of Moors, myself in native clothing, although my identity was known to the five men who accompanied me. We camped for the night about 4 miles from the city, to the south-east, at one of the small "nzalas," merely a few thatch huts enclosed in a "zareba" of thorn hedge, which give security from horse-stealers, etc., at night. These "nzalas" are erected at intervals all along the roads of Morocco, or rather the tracks, for roads, properly speaking, do not exist. The natives in charge are responsible for any theft that may take place, and in return for this responsibility are permitted by the native government to levy a small tax on any who may use the "zareba."

The following morning, November 2, we were off before daylight, our road proceeding in an east by south direction over the plain of Misfiwa, one of the large Bashaliks of Southern Morocco. During the morning two rivers were forded, the Wad Urika and the Wad el-Melha

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* Paper read at the Royal Geographical Society, Monday, December 10, 1894. Map, p. 408.

(salt river). Both rise in the Atlas mountains, the former issuing from the large valley of Akhliz, the second more to the east. The water of both is largely used for irrigating the plain, although the Wad el Melha is brackish. Some 10 miles north of the foothills of the Atlas they unite, in the province of Uidan, and, after running together some way as one river, flow into the Tensift near the Zaouia of Sidi Abdullah ben Sessi.

Some 15 miles from the city our road entered the Atlas mountains, at a spot where the large Wad Misfiwa emerges to the plains. The Berber name for the locality—for the inhabitants are one and all Berbers here—is Imin-zat, Imin being the Shelha word for mouth, corresponding to the Arabic "fûm," used so commonly for the same purpose, *i.e.* the opening of a valley on to the level. Here a decided change takes place in the formation of the dwellings of the natives, for instead of the "ghiem," or tents, and "nuail," or thatch huts, houses built of "tabia," native cement without lime, are found—a vastly superior type of dwelling, and peculiar to the Berbers in this part of the country.

Crossing the Wad Misfiwa by a difficult and rocky ford at Imin-zat, we turned more to the south, and, continuing along the east bank of the river for some 3 miles, we camped for the night at a miserable "nzala," where dirt and squalor reigned supreme. The valley of the Wad Misfiwa is at this part well cultivated, the land on both banks being neatly terraced for some distance up the hillsides. Grain, grapes, and olives seem to be the chief products, but almond and walnut trees are also plentiful. Near above the village is a large "sôk," or country market, held every Thursday, and thus known as "sôk el khamis." Above this spot the road takes an easterly direction, leaving the valley and ascending the buttress of the mountains between the valleys of the rivers Misfiwa and the Ghadat. This slope of the Atlas takes the form of a small plateau, with an average elevation of 3000 feet above the sea-level. The district is known as Tugána, and is under the jurisdiction of the Kaid of Misfiwa. But very few villages or habitations are to be seen, and the country is bare and desolate, being overgrown with brushwood. Continuing over the plateau for some 10 miles, we descended by an execrable path to the bed of the Wad Ghadat, near a ruined or uncompleted bridge. The river is swift, the bed boulder-strewn, and the passage, except at dry seasons, difficult, and often impossible.

During our passage on the plateau of Tugána we had to ford a small stream, the Wad Masin, whence a choice of roads lay before us, to the Glawi pass over the Atlas, namely, that we took, and another, steeper and less used, *viâ* Gadaruz and Tizi Aït Imicer. The latter is seldom followed except by men on foot, or by the small caravans of sturdy mountain mules. From the bridge on the Ghadat we pushed on to the large village of Zarkten, some 10 miles as the crow flies, but a march of some four hours, for the track zigzags in and out of the steep mountains, on the right bank of the river The direction of the valley is north and south. At all places it is narrow, shut in by high mountains covered with dense brushwood, the arbutus, laurustinus, evergreen oak, gum cistus, and a variety of pine being the most common, together with the "palmeto," or "azif." At places the river-bed is wide and stony, at others shut in by high walls of rock. The scenery is very fine during the entire way. Zarkten (elevation 3710 feet above the sea-level) is the residence of a deputy governor of the district of Glawa, and his residence forms the most important building in the place. It was the first example of a style of architecture which obtains amongst the Berbers of the southern slopes of the Atlas—a big square castle with high towers at every corner, gradually tapering toward their summits, and crowned with battlements. A garden of olive and walnut surrounds the castle, which is a large and imposing building.

Just above Zarkten the Wad Ghadat is joined by the Wad Tetsula, the latter continuing the general direction of the valley—*i.e.* north and south—while the Ghadat, rising in the snows of Jibel Glawi, or Tidili, flows down from the south-west. The Tetsula takes its name from a village higher up its course, but it is also known to the natives by the term Adrar n' Iri. At Zarkten is a "mellah" of native mountain Jews, whose tall stature and manly appearance compare very favourably with their co-religionists of the towns. Many carry arms, flint-lock guns as a rule.

Early on November 4 we left Zarkten, and after proceeding for a short distance up the valley of the Ghadat, ascended, by a rocky path to the south, a spur of the main chain of the Atlas. This district is called Ait Robaa, though, with the exception of a poor hamlet or two in the Ghadat valley, it seems to contain very few inhabitants. Five miles on the road descends steeply to the valley of the Tetsula, which river is at the village Agurgár ("walnuts"). The highest portion of the road between this ford and Zarkten is at a spot called Telettin Nuadil, where an elevation of 5600 feet above the sea-level is reached. We were now leaving wooded country and entering a district of bare rock and snow. Scarcely a blade of anything green was to be seen, the rocks and precipices presenting a forbidding surface of grey and black shales, and, higher up, beds of quartzite. Here and there, however, as at Agurgár, and further on at Ait Akherait, both on the right bank of the Asif Adrar n' Iri, or Tetsula, a few gardens, small and poor enough, enlivened the scene; but, with the exception of these and a few wind-torn evergreen oaks, little else was to be seen in the way of vegetation.

At a village, or rather a straggling house of loose boulders perched on a rock, and called Afúden Nugelud, we spent the night, finding shelter from the bitter cold in a dirty stable. It is close above this that the small village of Tetsula is situated, a little oasis amongst the rocks, for here the natives have scraped together a couple of acres or so of soil, and plant turnips, while a few walnut trees are also to be found.

At 10 a.m. on November 4 we reached the summit of the Atlas, at Tizi n' Glawi, 8150 feet above the sea-level. The stratum of quartzite overlying the shales extends here from peak to peak, forming, as it were, a wall between the mountains of Adrar n' Iri and Adrar n' Glawi, only a few yards wide, so that there is no pass, properly so called. Although we were at an elevation of over 8000 feet, the surrounding peaks appeared to be at least 3000 feet higher.

The pass of Glawa is the one most used by caravans proceeding to the Saharan regions of Draa and Tafilet, and there is a second road sometimes pursued, further to the east, *viâ* Demnat and Ait bu Gemmes, which leads out in the upper valley of the Dads river.

From the summit of the Tizi n' Glawi we descended some 2000 feet to the plain of Teluet, in which is situated the Kasba or castle of the Kaid of Glawa, the governor of the district. I had hoped from this spot to be able to pursue a road *viâ* Warzazat, where there are said to be some ruins, but, unfortunately, we found this impossible. A returning caravan, which had attempted it, but been obliged to retrace their steps, informed us that the tribes in that district were in revolt, and that the Kaid of Glawa had gone himself with troops to assert his authority. So we turned more to the east, and, carefully avoiding the governor's castle, forded the Wad Marghen, or Wad el Melha, as it is also called, some 2 or 3 miles further up. Crossing a watershed of some altitude, we descended some few miles further on to the valley of the Wad Unila, just above the large district of Tiúrassín. The Unila is a deep stream of fast clear water. Here it was for the first time that we saw the strange buildings in vogue amongst the Berbers of the south slopes of the Atlas, for, although the sheikh's house at Zarkten had given me some idea, the specimens here were far handsomer and larger, and as we approached the village, or rather collection of castles, the effect was very fine, their size and solidity being enhanced by the decorated towers at each corner of the houses.

The river Unila rises in the slopes of the peaked mountain of the same name, its source being a circular lake much venerated by the natives, and a place to which pilgrimages are annually paid. From all accounts, it seems that this lake occupies the crater of an extinct volcano.

The Wad Unila, after flowing through the districts of (1) Unila, (2) Assaka, (3) Tisgi, and (4) Ait Zaineb, flows into the Idermi, eventually joining the Wad Dads at Kheneg et-Tauria, and forming with it the Wad Draa.

The only European who had preceded me to Tiurassin was De Foucauld, Thomson's furthest in this direction being the kasba of the Kaid of Glawa at Teluet, whence he was turned back. From here my road diverged from that of De Foucauld, though meeting again a week's journey further on, between Dads and Ferkla. As far as it is known, my road had never been previously travelled or described by any European.

At the village of Ait Ali-u-Yahia, in Tiurassin, we spent the night of November 5 at an altitude of 5480 feet above the sea-level.

Leaving the river-bed the next morning, our road ascended by a steep course of a dry torrent to an altitude of 6800 feet above the sea-level. The mountains hereabouts are covered with scrub and stunted trees, the predominant being the "arar" (calitris) and the evergreen oak. A magnificent view of the extended peaks of the Atlas was obtainable from this spot, the first panorama we had seen from the south side.

A ruined fort, Teherumt, is passed, and two small rivers forded, one of which is known as Igurian; the name of the second, only a small stream, I was unable to discover.

We spent the night of November 6 at Agurzga, a large collection of towered villages perched in a most romantic fashion on the pinnacles of high rocks. The little district is completely enclosed by precipices, through a narrow gorge in which the river of the same name find ingress into the valley from the main chain of the Atlas, and another through which it pursues its course to the plain, eventually to join with the Wad Ghresat, and empty their united stream into the Idermi. The elevation of Agurzga I found to be 4850 feet above the sea-level.

Early on the morning of November 7 I left Agurzga, and, crossing a stony watershed, descended a couple of hours later to the river-bed of the Wad Ghresat. The summit of the spur which forms the watershed is exactly 1000 feet above the level of Agurzga. The Wad Ghresat possesses all through the year a good supply of water, clear and fast flowing. A few gardens of almond and walnut trees line its banks, while maize and turnips seem to form the staple food of the people. The villages forming the district of the same name as the river are, one and all, situated on the left (east) bank, and consist of the usual square "ksor" with high towers. The inhabitants, like those of Agurzga, are of the Imerghan tribe of Berbers.

It was here we emerged from the mountains on to the wide plain which stretches between the Atlas and the Anti-Atlas, or Jibel Saghru. This plain, for the most part of gravel and stone-strewn sand, slopes gently to the south, and is crossed from north to south by the various rivers flowing from the main chain of the Atlas toward the Wad Draa, of which river it forms, in fact, the basin.

The whole aspect of the country changes at this spot, for the barren precipices of limestone are left behind, and the open country entered. However, the latter is almost as barren as the former, and, with the exception of a few stunted thorny acacias and clusters of wild thyme, no vegetation was to be seen. To the south the northern slopes of the Anti-Atlas were clearly visible, as barren in appearance as are the southern slopes of the greater range. For almost 15 miles after leaving Ghresat one crosses desert, which, from its seven undulations, is called the "Sebaa Shaabat."

Near sunset we reached the large oasis of Askura (elevation 4200 feet above the sea-level). The oasis is split up into two portions, the westernmost situated upon the Wad Mdri, while the larger and eastern part is watered by two rivers, the Bu Jila ("a father of madness," so called from its floods) and the Wad Askura.

The inhabitants of Askura are Arabs, and with Tafilet are the only oases in this part of the Sahara inhabited by Arabs instead of Berbers. Although constantly attacked by the latter, their position in the centre of desert, and the fact that they are a hardy tribe and skilful horsemen, renders them safe from actual destruction. No more plundering thieves exist than these people of Askura, whose depredations on a passing caravan I myself witnessed.

The oasis contains many gardens, in fact it may be said to consist of gardens, one and all walled with "tabia" walls, over the tops of which the feathery heads of the thousands of palm-trees can be seen, and here and there apples, pears, pomegranates, and vines, and fine specimens of the *Tamarix senegalensis*. Although Arabs, the Berber style of building is in vogue, and many of the houses are excellent specimens of Southern Atlas architecture. The soil is extremely rich, and, owing to the excellent system of irrigation, large crops of grain, fruit, and dates are procured. The district is under the jurisdiction of the Kaid of Glawa, but his power over the turbulent people is little more than nominal.

It is in crossing the Wad Mdri that one notices for the first time a peculiarity that one is constantly coming across on the road to Tafilet—namely, the sunken river-beds, nearly all of which lie some 50 to 150 feet below the level of the plain. Usually a low range of hills skirts each bank of the river, about a mile to the east and west of its actual course, and there flat-topped hills, formed, no doubt, by water, form strange lines across the plain, running as they do at right angles to the Atlas and the Anti-Atlas, and connecting these two ranges.

The oasis of Askura is divided into four "kabylas," or tribes—(1) Kabyla el Ostia ("centre tribe," so called from its position); (2) Kabyla Mzuru; (3) Ulad Yakub; and (4) Ulad Magil. Each is governed by a Sheikh. It is impossible to give any tolerably correct estimate of the number of the inhabitants of the district, but the local boast that they can put twenty thousand armed men into the field, probably means that about eight to twelve thousand males, capable of carrying arms, are to be found there.

Just as 15 miles of desert divided Askura from Ghresat on the west, so do some 12 miles separate it from Imasín on the east. We did not stop at the district of Imasín, where are a few poor "ksor" inhabited by Shereefs ("descendants of the Prophet"), but pushed on some 12 miles more until the valley of the Wad Dads was reached at Ait Yahia, and there we spent the night of November 8. Ait Yahia is a settlement of the powerful tribe of Seddrat, other divisions of which are to be found scattered about the surrounding country. It is here at Ait Yahia that the Wad Imguna flows into the Wad Dads, which further down its course, on its junction with the Wad Idermi, forms the Wad Draa. The Imguna flows from the Atlas, rising near the perpetually snow-covered peak of Trekeddit. At Ait Ahmed it leaves the mountains, and for some 20 miles of its course, until in fact it joins the Dads at Ait Yahia, its banks are inhabited by the powerful tribe of Imguna.

We spent the night of November 8 at Ait Yahia, at the village of Idu Tizi, at an elevation of 4700 feet above the sea-level.

Many natives visited our humble little tent, for a Dads Shereef, well known in the district, accompanied me; but as they spoke the Shelha language, and only one or two knew any Arabic at all, and that of the very slightest, I did not enter much into the conversation. My disguise was never for a moment suspected, for Europeans are unknown in these parts; nor would the natives look to find an "infidel" in the garb of the servant of a Shereef.

We had now approached quite close to Jibel Saghru, the Anti-Atlas, under the northern slopes of which this portion of the Wad Dads flows, for it is a few miles above Ait Yahia that the river abandons its southern course and turns more to the east.

The range of Jibel Saghru bears no resemblance to the main chain of the Atlas, which presents on its south side, as far as the eye can reach, an unbroken line of limestone peaks, tipped in snow, and varying very little in altitude. The Anti-Atlas, on the contrary, is volcanic in appearance, red, black, and purple in colour, and torn into all manner of strange forms and shapes. The only resemblance between the two ranges is their common sterility, for the slopes of neither—except in the actual valleys, and there only on the river-banks—bear any vegetation worth speaking of.

On November 9 we crossed a small plateau on the right bank of the Dads, and descended toward midday to the Zauia Ait bu Haddu, the village in which the Shereef whom I accompanied resided.

Dads certainly is the most important strategic position between Morocco City and Tafilet, for its powerful tribe inhabit both banks of the river of that name from where it emerges from the main chain of the Atlas to Ait Yahia, where, seeking a more westerly course, it flows almost immediately below the slopes of Jibel Saghru, the Anti-Atlas. Every caravan proceeding to and from Tafilet has to pass through the district, and it is therefore easy for the inhabitants to keep up an alliance with the surrounding tribes much to their own benefit, for they allow all caravans to pass their country in safety in return for equal privileges elsewhere. Should a Dads caravan be plundered by any other tribe, woe betide the next batch of baggage animals that passes through their lands.

A word must be said as to safe-conducts amongst the Berbers. The two words in use are "zitat" and "mzareg," the latter of which means "a spear." This name is derived from the fact that in the old days it was the custom for a stranger passing through Berber tribes to be lent the spear of a member of the tribe in question, which, being recognized, rendered the bearer free from molestation. Spears have long ago disappeared, but often some well-known badge is carried in its place, and still more often a member of the tribe accompanies the stranger until the limits of their territory is reached.

The Jews exist in this part of the Sahara under much the same system, only in their case the name "debeha" ("sacrifice") is applied, from the fact that the protection of an influential Berber is obtained by the sacrificing by the Jew of a sheep or a goat. However, nowadays most of the Jewish families have hereditary protectors, the vassalage descending in both families from father to son. Any injury to the Jews is avenged by the Berber, as if it had been offered to a member of his own family. In return for these privileges, the Berber manages to squeeze a small amount of tribute out of his vassal. The Jews inhabit separate villages, but mix freely with the native inhabitants. Although despised, there seems to be little or no persecution, and the hard life led by Jew and Berber alike tends to make far finer men of them than are found in other parts of Morocco.

The tribe of Dads is divided into six "kabylas," or districts: to take them from the south—(1) Arbaa Miya ("the four hundred"); (2) Iutagin; (3) Ait u Allel; (4) Ait Hammu; (5) Ait Iunir; and lastly, Ait Tamuted. Of these the first named is the strongest and most powerful, possessing some forty strongly defended "ksor," or castles.

Unfortunately, space does not allow of my narrating many particulars of my stay of five days at Dads, where I resided as a native amongst the Berbers, and had many opportunities of examining their manners and customs. Suffice it to say, their domestic life is moral, simple, and peaceful. There seems far more fraternity amongst the people than amongst the Arabs. The women mix freely with the men, and do not cover their faces. The inhabitants are fair-skinned, with dark eyes and eyelashes. The men shave the entire face, except for a small pointed beard on the chin, and a fine line of short hair joining it on either side to the ear. Fierce in war, and brave to a degree, their home life is pleasant and cheerful, and many happy hours I spent wandering in the gardens by the river-banks, or talking of an evening over our supper. Nearly all the better class speak more or less Arabic.

The houses contain large high rooms, with scarcely any windows, the smoke of the fires passing out through apertures in the wall on the ground floor, and in the upper storeys through holes in the flat roof. A "minzah," a room from which a view can be obtained, is erected on the roof, and forms the usual rendezvous of the men. Cleanliness is apparent everywhere, and the people are neat and tidy.

The women decorate, or rather disfigure, their faces with "henna," a red stain; and "kohl" (antimony) is largely used for prolonging the eyes, etc.

All along the cliffs that bound the river Dads large excavated caves are to be found, the historical origin of which is lost. A few are still inhabited by a portion of the tribe known still as Ait Iferi, the sons of the caves. Some of these caves are looked upon with particular reverence, and in one the Jews expose their dead for a night before burial.

The flat banks of the river extend from its actual bed to an average of from a quarter to half a mile east and west, where steep cliffs bring one to the level of the surrounding desert. The valley is interspersed with irrigating canals, which carry water to every part. Rain seldom falls, sometimes never in the course of the year, and upon the water-supply from the river the natives are dependent for their entire stock of food. Fed by the eternal snows of the Atlas, happily the stream never fails. Turnips, maize, and figs seem to be the staple food of the people. The latter are dried on the housetops, and stored for winter use. They are extremely hard and nasty. Meat is but seldom tasted, and fowls are scarce. There being no grazing land, cows are stall-fed, "fsa," a kind of lucerne, being grown for the purpose. The fifth day after my arrival at Dads, having proceeded the afternoon before some 20 miles up the river, we set out to cross the desert of Anbed, some 15 miles across. I had now only three men and a donkey with me, having left all my scanty baggage and my mule at the village I had stayed in at Dads. This was on account of the precarious state of the roads ahead of us, which abounded in robbers. It was detection that I feared more than robbery, though the latter might easily lead to the former, so I left everything behind and set out on foot.

Descending from the plain of Anbed, we reached the small and dreary settlement of Imiteghr, crossing the river of that name, which further on, joining the larger Wad Todghrá, takes the latter nomenclature. One "ksar" alone at Imiteghr seemed in tolerable repair, and even that was a poor-enough place. Its name was Igbir, and it is mentioned on De Foucauld's map. From Dads to Imiteghr, and again from beyond to Todghrá to Ferkla, my road was identical with the French explorer's, that is to say, for a distance of some 35 miles.

Leaving the route usually pursued by caravans and the natives, we turned more to the south, and, keeping parallel with the Wad Imiteghr, reached at sundown a small "zaouia" of shereefs of Mulai Brahim, who received us kindly and housed us in the mosque, where a supper of boiled turnips was brought to us later on. I could not help thinking how disastrous would be the consequences if the fact that I was an "infidel" should be discovered while I was using the mosque, for even in civilized Tangier no Christian is allowed to enter them. Leaving before dawn on November 14, we entered a gorge in which the river flows, through which we passed for about a mile and a half. It is known as Imin Erkilim, the mouth of Hercules (?); but I was unable to discover any tradition why it was so called. One emerges close to the "ksor" of Ait bu Kanifen, celebrated cut-throats. A few hundred yards of plain and the oasis of Tiluin, or Ait Iluin, is reached, and under the luxuriant growth of palm trees we breakfasted.

Thence a couple of miles of desert brings one to the lower end of the oasis of Todghrá, situated on both banks of the river of that name. The palm groves could be traced for many miles, following the course of the river above us. On returning from Tafilet, we proceeded by another route at this part, following the course of the river as far as Taurirt, where we spent the night. This latter is the usual course pursued by the native caravans, etc. Palms, which are here so plentiful, as at Askura, are not to be found between the two districts; I saw none at Dads or elsewhere on the road, though as we proceeded eastward they became general, until the climax is reached in the unparalleled groves of Tafilet itself. The Wad Imiteghr joins the Todghrá at an elevation of 4250 feet above the sea-level. The rivers now flow east, the plain of Anbed forming the watershed between the basin of the Wad Gherís and the Wad Draa. The Todghrá eventually enters the former, and, after joining the Wad Ziz at Tafilet, is absorbed by the sandy desert near the marsh of Dayet ed-Daura.

Having crossed the Todghrá, we passed the solitary settlement of Tabibast, and entered the desert once more, and for some 16 miles travelled over a stony plain known as Seddat, our road running parallel with the Todghrá, which lay equi-distant between us and the Anti Atlas, a couple of miles perhaps from each.

Ferkla was reached at sunset, and tired and weary we were after some 40 miles' walk, when, in the very thick of the oasis, we put up for the night in the large fortified village of Asrir—almost a little town, with fine tall houses and tunnelled roads, as in the cities of Morocco proper. The large oasis of Ferkla is inhabited by portions of several of the large Berber tribes, namely, Ait Merghad, Ait Isdeg, Ait Yafalman, and the Arab tribe of Ahl Ferkla. There are also several "mellahs" of Jews. I found the elevation of Asrir to be 3260 feet above the sea-level.

We left Ferkla before dawn on November 15, and, crossing the winding river twice, emerged an hour later from the groves of palms. Ten miles from Ferkla the road, which from Ghresat to this spot had been almost due east and west, takes a sudden turn to the south, entering by a gorge a valley of the Anti-Atlas, through which the Wad Todghrá flows to emerge again south of Ul Turug, near where its junction with the Gherís is situated.

A picturesque fortified village, on the summit of a high rock, completely dominates the valley, standing equidistant from the hills on either side, by name Igli; while a mile further on, where the road turns again for a time to the east, are situated the luxuriant palm groves and villages of Milaab. The road, having crossed the Todghrá again at this spot, bisects the palm groves, and the scene as we passed through was a charming one, the soil well cultivated with "fsa" and maize, while above waved the feathery heads of the palms. Water in tiny channels flows in every direction. The inhabitants belong to the Berber tribe of Ait Iazzer. This portion of the valley of the Todghrá is almost circular in form, the river leaving it at the south-east corner by a narrow gorge, while the road proceeds more directly east, and crosses a range of low, black, barren, stony hills. Descending from the summit of these, one reaches the northern end of the large oasis of Ul Turug, quite near the enormous "ksar," the largest walled village we saw anywhere in the Sahara. Space has not allowed of my describing any details of the other "Ksar" we had passed through, but the size and importance of Ul Turug justifies some few words.

The upper portion lies on the steep slopes of the eastern extremity of Jibel Saghru, known at this point as Jibel el Kebir, while the lower portion extends over the level. The entire "ksar" is surrounded by high walls of "tabia" of great thickness, above which appear the flat roofs of such houses—and they are many—as possess two stories. One gate alone gives entrance and exit, and this gate, as is the custom all through the country, is closed from sunset to dawn.

Within, on passing through the gate, one enters a great square, surrounded on two sides by high houses, and on the other two by the outer walls and towers of the fortifications. Streets branch off from this square to various parts of the "ksar." Under the walls on the south side an arcade runs for some distance, facing the square, and serving as a store and stable for passing caravans, where goods can be piled up away from sun or rain. In using the word "caravans," it must not be understood that merchandise is taken by this route to Tafilet to any extent. Such caravans as do travel consist merely of the small mules of the Berbers laden with dates, or returning with pig-iron, wheat, or sometimes manufactured goods. Ul Turug is the principal stronghold of the powerful Berber tribe of Ait Atta, whose territory extends from several oases to the north, throughout Jibel Saghru as far as the Wad Draa, the inhabitants of which acknowledge the suzerainty of the Attaui chiefs, and pay tribute in return for their guaranteeing their immunity from other plunderers.

Passing the night of November 15 at Ul Turug we left the following morning as soon as the gate was opened. Issuing soon after sunrise from the palm groves, we entered upon 12 miles of dreary desert, called Maghra, on the edge of which we forded the Wad Todghrá, near where it flows into the Gheris. Our road now lay almost due south, parallel with the eastern front of Jibel Saghru.

An extraordinary example of the labour employed in carrying water from place to place is here visible, for the desert of Maghra is threaded by no less than eleven rows of subterranean aqueducts. These channels are formed in the following manner: Pits some 30 feet deep by 10 in diameter are sunk some 20 to 25 yards apart and joined by a tunnel, through which the water flows. A rough estimate gives the result that, in order to bring water from the Wad Todghrá to Tiluin, the next oasis, 11 miles distant, no less than some nine thousand of these pits must have been sunk, and the intervening spaces tunnelled—a vast and stupendous piece of labour.

The inhabitants of Tiluin are a branch of those of the same name inhabiting a small oasis near the eastern end of the Imin Erkilim, whom I have mentioned already. The principal home of the tribe of Ait Iluin is near the oasis of Gheris; they are a subdivision of the powerful tribe of Ait Merghad. Almost contiguous with Tiluin, and separated only by a narrow strip of desert, is the larger and more flourishing oasis of Fezna, a division of the tribe of Ait Yafalman. It is curious to note the extraordinary manner in which all the tribes and subdivisions of the tribes inhabit different parts of the country; but such must be the case in any land where warfare, conquest, and reconquest are as common as in this corner of the Sahara desert.

Again, only a strip of desert divides Fezna from Jerf, the next oasis. This large settlement of Berbers takes its name from a prominent cliff which juts out from Jibel Saghru into the plain terminating above the oasis. The buildings of Jerf are the usual "ksor," though from Ferkla on they had gradually been losing their highly decorated appearance, and becoming larger and stronger instead. So fertile are these large oases of palm that a much greater number of lives can be supported by the produce of the soil than is the case on the river-bed of Dads, for instance, and the result is apparent in the large population of the "ksor."

From Jerf the road, proceeding almost due south, leads one through a long string of small oases situated on the right (western) bank of the Wad Gherís. The first of these is Bauia, and a mile or two further on Kasba el-Hati, and but little further Ulad Hanabu.

Here we forded the large bed of the Wad Gherís, the waters of which are salt, and, ascending the east bank, spent the night at the large "ksor" of El Meharza, the capital of Se-Sifa, one of the provinces of Tafilet.

I had left Morocco City on November 1, and arrived in Tafilet on the evening of the 16th of the same month.

Tafilet, Tafilelt, or Tafilalet, as it is variously called, is said to derive its name from Filal, a district in Arabia, and to have obtained its present form from the addition of the Berber prefix Ta, or Ait, "the sons of." The final *t* is again a Berber addition, being no doubt the feminine termination. It is from the fact that the root of the name owes its origin to Arabia that one comes to the conclusion that before the Arab invasion it must have borne some other title, and one is naturally led to fall back upon Sijilmassa, the ruins of the city of which are still visible, and there is every probability that this was its original name.

The district of Tafilet may be said to consist of a long strip of irrigated land extending along the parallel beds of the Wad Ziz and Wad Gherís. Although two districts lying further to the north, Ertib (Reteb) and Medaghra, are often included in Tafilet, they seem in the eyes of the natives to form separate provinces, and as such I shall treat them, or rather ignore them, as my travels in the oasis did not take me as far north.

The Wad Gherís we had already seen, but the day after my arrival in Tafilet, proceeding from Meharza to Dar el-Baïda, on the east of the oasis, I crossed the Wad Ziz, the river from which the principal supply of water for irrigating purposes is drawn. The channel is deeply sunk between high banks of clay, sand, and alluvial soil, the actual stream at the time of my visit occupying perhaps one-third of the river-bed, and averaging from 60 to 100 feet in breadth at the ford where we crossed it. The water is clear and very fast-flowing.

Tafilet boasts seven provinces—

(1) On the north, Tizimi.
(2) On the west, Es-Sifa.
(3) On the south-west, Wad El-Melha.
(4) In the centre, Wad Ifli.
(5) On the south, Es-Sefalat.
(6) On the east, El-Ghorfa.
(7) On the north-east, Tanijiud.

To attempt correctly to estimate the extent of ground which these districts cover, and which is under cultivation, would be too hazardous to be of much value, for the oasis varies so much in width from place to place, according as the irrigating canals are taken far afield or not, that nothing short of a careful survey would give a satisfactory result. Again, it is equally impossible to state the southern limits of the oasis, for much of the land situated south of the junction of the Wad Ziz and Gherís is only capable of cultivation after exceedingly heavy rains in the Atlas mountains, where the rivers rise, in which case the natives of the Ait Atta tribe cultivate the banks as far as the Dayet ed-Daura. However, to make a rough estimate, it is probable that some 450 square miles are under palm cultivation.

To take the provinces in the order I have given :—

(1) *Tizimi*, Ait Izimi, is a large district extending along the west

bank of the Wad Tizimi, as the main channel of the Wad Ziz is called at this part. The inhabitants are Arabs of the Ahl Souba tribe, and are constantly at war with the Berbers of Medaghra and Ertib, whose country lies higher up the same river. The principal "ksor" are Kasba el-Barania, Kasba ben Ali, and Ksar bel Hassen.

Separating Tizimi from its two nearest neighbouring districts, Es-Sifa and Tanijiud, it is a strip of desert varying in width from 2 to 5 miles, through which the river flows, the only vegetation being a few oleanders and reeds on its banks.

(2) *Es-Sifa* forms the western province of this oasis. It lies between the Wad Gherís and the Wad Ziz, which are here some 5 miles apart, their courses being almost parallel. The land is, however, irrigated almost entirely from the Wad Ziz, on account of the saltness of the water of the Gherís. The country is poor, the gardens only half cultivated, and many of the garden walls entirely destroyed. El-Meharza is the capital of the province, situated high above the left (east) bank of the Wad Gherís.

(3) *Wad El-Melha*, the next province, lies directly to the south of Es-Sifa, and forms the south-western corner of the oasis. As its name implies (" salt river "), it takes its title from the Wad Gherís, which flows through it. Taghranjiut, situated in Beled er-Riad (" garden-land "), is the principal " ksar."

(4) *Es-Sefalat* forms the southern province of Tafilet proper, its boundary on the west being the Wad Gherís, while on the east it extends some way across the Wad Ziz. This district possesses the largest " ksar " of Tafilet—Tabu Assamt (Ait abu Assamt); but, in spite of its size, it plays no important part in the trade or welfare of the oasis.

(5) *El-Ghorfa* is bounded on the east near the desert, and lies entirely on the eastern side of the Wad Ziz. Near its southern boundary is the Sebkhat Aamer, a large salt lake, the produce of which is a monopoly of the shereefs of Tafilet, relations of the present reigning sultan, for it is from this remote oasis of the Sahara desert that the ancestor of the present dynasty reigning in Morocco sprung.

(6) *Tanijiud* is the north-east province, and, like El-Ghorfa, is bounded on the east by the desert. Its water-supply is brought by camels from the Wad Ziz, diverging from the main stream at Iniyerdi, in Medaghra. The cutting off of this water-supply above by the Berbers is a constant incentive to warfare.

(7) The sole remaining province, *Wad Ifli*, is by far the most important, and on this account I have left it to the last, for, with the exception of Es-Sifa, a small part of Es-Sefalat and Tizimi, and a corner of Tanijiud, I did not travel in the other districts. As Wad Ifli is surrounded on all sides by the other provinces, it is far more immune from attack from without, and has thus become, though not the largest district, the centre of religion, learning, and more especially trade, in

the oasis. Here, too, is the tomb of Mulai Ali Shereef, the founder of the present dynasty, who came, a refugee from Yembo in Arabia, to Tafilet in 1620 A.D. The gardens of this province are in far better repair than elsewhere, and the irrigation-canals in excellent working order. The principal "ksor" are Abu Aam and Rissani; the former the seat of trade, the latter of the government, though to all intents and purposes there is none, beyond the tribal councils and the influential shereefs, who are appealed to in cases of dispute. Near these two "ksor," and about equidistant from each, is held the great weekly market of Tafilet, the arbaa of Mulai Ali Shereef. The market-place is an open square amongst the palm-groves. A peculiar appearance is added to the scene by the huts in which the natives sell their produce. Timber being a valuable import, these are built of mud-bricks and sand, and are in the shape of beehives, the domes on the summit being pointed. The shade is sufficient to keep such goods as sugar and candles from being spoiled by the sun's rays. The inhabitants of Tafilet are nearly entirely Arabs. The principal divisions or tribes are:—

(1) The Shereefian families.
(2) The Ahl Suba Arabs.
(3) Beni Mohammed.
(4) Tafilet Arabs.

Such Berbers as there are belong almost entirely to the tribe of Ait Atta, whose stronghold we had visited at Ul Turug.

Nearly all the manual labour is done by the Haratin—a word implying "free men," in contradiction to slaves—who come from the banks of the Wad Draa, and are largely impregnated with black blood, the negro type being shown in their heavy build and thick lips. A few words must be said as to the cultivation of the dates, which, with leather-work, forms the sole industry of Tafilet. The water for irrigating purposes is brought by many canals from the Wad Ziz to the palm groves. The soil under the trees is carefully dug, and divided by low raised banks into squares some 10 to 20 yards in extent. Into these, by removing a small part of the bank in which the water flows—for the canals are raised above the general level of the soil—a connection is formed with the canal and the land flooded, the water being allowed to proceed from square to square by removing portions of the dykes. The object of this irrigating of the patches separately is that there may be no waste, only the portion which actually requires water receiving it. These squares are cultivated with "fsa" (lucerne); some wheat and barley, where the shade of the palms is not excessive; and maize and turnips, the latter of which are not so common as in other parts of the desert, the dates taking their place as the staple article of food of the people. Not only, however, does the palm supply the human being with provision, but the coarser species of dates are employed for fodder, such cattle as there are and horses and donkeys being fed almost entirely upon them. The finer kinds are exported to Fez and Morocco City by caravan, the empty pack-animals bringing in return wheat and European manufactures, and rough iron for weapons and agricultural purposes, etc. It is a curious fact that some 90 per cent. of the export of Tafilet dates from Morocco go to London, and some years, I believe, England has received the entire supply. The export trade is mostly carried on by the native merchants of Fez, and is, of course, by no means a large one.

The "ksor" of Tafilet are large and strongly fortified, one and all possessing only one gate, on entering which the stranger is scrutinized and often questioned by the "boab," or gatekeeper. It is in the district of Wad Ifli that the ruins of the city of Sijilmassa are situated, and in crossing the oasis from El-Meharza to Dar el-Baida, I took the opportunity of visiting them, for they lie almost upon the road. The place must at one time have been a very large city, though but little remains now but crumbling ruins, with a mosque and minaret in tolerable repair, and a half-ruined bridge over the Wad Ziz. "Tabia" seems to have been almost entirely used in the construction of the buildings, though there were here and there signs of stone ruins. In any case, any stone employed must have been brought from a long distance, probably from the slopes of Jibel Saghru to the west. Although the name of Sijilmassa is still remembered and used, the commoner term for the ruins is "Medinat el-Aamra." Situated on the very banks of the Wad Ziz, the bed of the river is so low that it would be no easy task to carry the water up for the supply of the town, so a canal was made connecting the river much higher up with the town, and it speaks well for the workmanship to say that the water is still flowing fast and clear between its well-formed banks. Several small bridges, also to-day in good repair, cross this canal. The date of the founding of Sijilmassa is difficult to gather, for, probably long before the town was built, there was a Berber colony there; but the period of its destruction is better known, and was shortly before the end of the last century, when, after years of internal strife and jealousy amongst the native princes, it was sacked by one more successful than the rest. It is still much reverenced, however, and on the Eid el-Kebir, and Eid es-Soreir, the two great feasts of the Moslem year, a large concourse of people gather together to pray at the "msala" near the mosque.

A word or two must be said, in conclusion, with regard to the caravan road from Fez, the most direct and most commonly travelled route to Tafilet—that is to say, by natives, of course, for, as far as is known, only two travellers had reached the oasis previous to my visit, René Caillié in 1828, and Gerhard Rohlfs in 1862. Eleven days is the time usually occupied by caravans in accomplishing the journey from Fez. The stoppages are usually as follows: (1) From Fez to Sufru, a small town some 16 miles south of the capital; (2) Tagharzut, in the Beni

Mgild country; (3) Njil, in Ait Yussi; (4) El-Kasabi, after which the Atlas are crossed at Tizi Telrempt, on the east of Jibel Ayashi, whence the basin of the Wad Guir and Wad Ziz is reached; the (5) station being a "nzala" near the junction of these two rivers; thence (6) to Gers, and from Gers Tafilet is reached in four or five days, generally early on the fifth, the caravans stopping at any of the "ksor" they choose in the valley of the Wad Ziz, for the road for this latter part of the journey runs parallel with the river. I spent nine days at Tafilet, in the camp of the sultan, where I made my identity known, having succeeded in pushing so far without my disguise being discovered.

Returning by almost the same route, only two or three slight variations were made in my road. At Todghrá I verged to the north and spent a night at Taurirt, instead of proceeding *viâ* Imin Erkilim and Ait Mulai Brahim, and, after crossing the Wad Marghen at Teluet, we turned to the west and spent a night at the great stone castle, or Kasba, of the Kaid of Glawa, an extraordinary fortified building of stone, situated at an altitude of 6900 feet above the sea-level. It was here that Mr. Joseph Thomson had unfortunately been turned back by the governor on his attempt to push through the Atlas mountains in 1891. On reaching the ruined bridge at Tugána, I continued down the river course, and spent a night at the zaouia of Sidi Rehal. Although it was raining fast the descent from the Atlas to a warm climate was most pleasant, for ever since my arrival in Tafilet there had not been a night in which the frost was not extreme, and once or twice the puddles on the road never thawed at all during the day, though the sun was usually hot. I reached Morocco City towards the middle of December, and was once again in Tangier on January 9.

Want of space has forced me much to curtail the notes of my journey and to give only its outline here, but I trust before long to be able to make public the details of my entire journey, together with the sketches and photographs I was able to obtain.

Before the reading of the paper, the PRESIDENT said: We are favoured this evening by the presence of Mr. Walter Harris, known to many of us from two or three interesting papers already communicated to us for our *Journal*, who made a very adventurous journey last year across the Atlas mountains as far as the oasis of Tafilet. He has gone over a country most of which had not been traversed before by any European, and as he is not only an intrepid traveller, but a good artist, he will be able to add to his description by some interesting illustrations. I now call upon Mr. Harris to have the kindness to read his paper to us.

After the reading of the paper, the following discussion took place:—

The PRESIDENT: I don't think there are many people present who can discuss Mr. Harris's paper from personal knowledge, and I am sorry to see that the only Fellow of this Society, upon whom I had my eye and who has some knowledge of Morocco, has just left the room, Sir Francis de Winton. In the meanwhile, if any one present has any remarks to make on Mr. Harris's paper I shall be very glad.

Admiral Sir ERASMUS OMMANNEY: My experience of Morocco is confined to the coasts. Often from Gibraltar I have looked upon the Atlas mountains and longed to know a great deal more about them, and have never yet heard so much about them as during this evening. I think we are very much indebted to our friend, Mr. Harris, who is the first to bring to the Royal Geographical Society such a large knowledge of this country and its inhabitants. The question of Morocco is one for the future, as we know that the fanaticism of the Mohammedans has hitherto prevented any sort of innovation or improvement. I know that the lecturer will agree with me that the country has wonderful tracts of land that, if properly fertilized and cultivated, might become the granaries of Europe almost. I hope that Morocco, which at the present time is only a port of Africa, will not fall to be divided by Europe, but that some enlightenment will arise which will tend to the development of so valuable a portion of the world so closely connected with Europe. I cannot sufficiently express my gratitude to the lecturer this evening for the information he has given on this part of Morocco.

The PRESIDENT: Mr. Harris's paper, I feel sure, has given an immense amount of pleasure and interest to the meeting. I think, as far as I can make out, that he is the first Englishman who has crossed the Atlas mountains. In the first volume of the Society's *Journal* we had an admirable account of Morocco from our late secretary, Admiral Washington, and that was the paper we looked to as the highest authority on the subject for thirty years, until we received the account given by Mr. Rohlfs, who turned the flank of the Atlas. He landed at Aghadir, south of the mountains, and made his way to Tafilet along the southern slopes. I think the Vicomte de Foucauld also crossed the Atlas. We had interesting letters from Sir Joseph Hooker. Sir Roderick Murchison gave us an admirable picture of the part of the Atlas he explored. Mr. Moore, I believe, ascended to a height of 12,000 feet. The next traveller was our friend Mr. Thomson, who took the same route as Mr. Harris, but was turned back by that old ogre the Khaid of Glawa, whose castle was so admirably depicted on the sheet. Mr. Harris has given us an account of the whole of this land such as we have never received in this room before. He has described to us the chief peaks of the Atlas and the picturesque valleys and gorges. He told us before he came here that the scenery was ugly; I must say it will be the opinion of this meeting that the pictures belie that description. More magnificent and picturesque scenery I never saw. Mr. Harris explained to us the most interesting method of irrigation adopted by this people, which has rendered fertile such vast tracts of country that would otherwise be desert, including Tafilet. That same system, many of us will remember, is also used in Eastern Persia and Afghanistan, as it was by the Incas of Peru in the coast valleys. It is extremely interesting to see how such different peoples adopt the same system for their requirements. We have many other things to thank him for. We have to thank him for having been the first Englishman to cross the Atlas mountains and reach this mysterious oasis of Tafilet. We have to thank him for this most interesting paper and the fine illustrations, the best I have seen since I have had the honour of presiding here; and I hope Mr. Charles Ingram, who, I believe, is present, will allow me, on the part of this meeting, to render to him our very hearty thanks for the exceptional favour of allowing these pictures to be shown. We also have to thank Mr. Harris for the admirable delivery, and the way, I am quite certain, in which he made every word he spoke clearly heard in every part of these rooms. For all these favours I propose a vote of thanks, and I am sure that it will be carried by you with acclamation.

MR. HARRIS'S MAP.—This map has been reduced from a rough route survey made by Mr. W. B. Harris.

FOUR MONTHS OF TRAVEL IN BRITISH GUIANA.*

By GEORGE G. DIXON.

The object of the paper which I am about to read is to place before you the result of a journey lately undertaken by me in that portion of British Guiana known as the North-West District. I started from Arawatta, an Indian settlement above the first falls on the Barima river, overland, to near the head of the Akaribissi creek, and following the course of this creek to its junction with the Kuyuni river, then up the Kuyuni to the Government frontier station at Yuruan; secondly, from Yuruan down the Kuyuni to the mouth of the Takutu creek, and from thence overland to my original starting-point on the Barima; thirdly, up that river to its source in the Imataka mountains.

As circumstances obliged me to limit my travelling paraphernalia to the barest necessities, I was only able to take with me a compass, a level, and an aneroid; therefore my observations were necessarily of a very limited nature.

I set out from Georgetown on April 19 last, with provisions for four and a half months, and six Indian carriers, who, being of various tribes, would also act as interpreters when required.

The steamship *Penwortham* landed us at daybreak on the 20th at Morawhanna, the seat of government of the North-West District, a well-arranged and healthy town, surrounded by cultivated lands, standing where only six years ago all was swamp and desolation. From here, thanks to the kindness of Mr. im Thurn, the Government agent, my journey to the foot of the first falls in the Barima river was greatly facilitated. Two years ago the course of the Barima, from the mouth of the Anabissi creek, was rendered dangerous even for small boats by the quantities of sunken timber, which impeded navigation at every turn. Now, thanks to the energy of the Government, matters are greatly improved, and its course has been sufficiently cleared to admit of the passage of steam-launches to the foot of the first falls.

For about 100 miles the river winds between low-lying banks, thickly covered with tropical growth, the first indication of high ground on the right bank being an isolated hill called Mount Everard, which is the highest point reached at present by the coasting-steamer from Georgetown. From its summit, which has been cleared, an extensive view can be had to the north-west, the country, as far as the eye can reach, presenting a level appearance, broken only occasionally by insignificant hillocks, and everywhere clothed with thick forest. Twelve miles above Mount Everard is the Government station of Koriabbo, built on a slight elevation on the right bank. At the back of this, southwards, small hills and ridges rise out of swamp. On nearing the falls the nature of the ground begins to change, assuming a bolder character; and at the junction of the Maniakura creek with the Barima, spurs of the Imataka range come down almost to the water's edge, having an elevation of some 400 feet above sea-level, rising gradually from the flats, their summits rarely exceeding a few feet in width.

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* Paper read at the Royal Geographical Society, February 11, 1895. Map, p. 408.

From Koriabbo my journey was made in a tent-boat, propelled by paddlers up the winding Barima, whose course is so tortuous that few of its reaches exceed 500 yards in length. Four days of constant paddling brought us to the foot of the falls, and here the boat had to be unloaded and hauled over them, the stores being carried overland.

On the evening of the following day, after passing more smaller rapids (over all of which the boat had to be dragged, the river being very low), we arrived at the Indian village of Arawatta. It takes its name from a local superstition that some rocks in the river hard by are inhabited by howling monkeys (called "Arawatta" by the Indians), whose weird cries may occasionally be heard (according to the legend) when Barima is in flood. The head man of the settlement, a semi-civilized aboriginal with whom I had had previous dealings, allowed me to leave the stores we did not require for our journey to the Kuyuni at his house. We started on May 1, following an old Indian trail, which lead us southwards over an undulating country traversed by innumerable creeks; we were, in fact, travelling over the divide between the Arakaka Paru and Whanna creeks, tributaries of the Barima. Nearly every flat showed signs of having been prospected for gold in a perfunctionary fashion, several were being worked, whilst others had been partially stripped of their top soil and then abandoned. As we travelled southwards we left behind the Mora trees (*Mora excelsa*), with which up to the falls the banks of the river are covered, their place being taken by crab-wood (*Carapa guianensis*), cork-wood, cedar, and locust-gum (*Hymenæa courbaril*), and where the ground is more elevated, the purpleheart (*Copaifera pubiflora*). After walking for an hour and three-quarters, we came to the placer workings of Messrs. Garnet, the most extensive in this locality. Here in many places appear dolerite rock, and quartz croppings can be traced for some distance.

On leaving this mining-camp, we proceeded due south down an old prospecting-trail, which is crossed in many places by outcroppings of quartz. After traversing two small ridges of 550 feet above sea-level, we reached the main ridge of the Imataka mountains, which I followed in a westerly direction, until I gained the summit of one of its highest points, 880 feet above the sea-level. Here I opened a clearing to the north-east, so as to get a view of the camp we had left the day before. I was amply repaid for the trouble and delay, by the magnificent panorama the Indians' axes disclosed to view—everywhere undulating country clothed with dense tropical forest. There were occasional small ridges, generally not more than 300 feet above sea-level, with here and there a higher point having an altitude of perhaps 800 feet.

Having thus obtained a good view of the country to the north of us, I had a clearing made southwards to overlook our line of travel, and this disclosed several high hills to the south-east, and a branch ridge of the Imatakas running south-west.

Early on the morning of the 11th we broke up our camp, and, returning to the south line, followed it to its termination, and then commenced cutting a due south compass-trail. When descending the southern slope of the Imatakas, we were on the water-parting of the Barima river, and crossed creeks having a swifter current than any we had yet met with. Other beds were full of small boulders, which the force of the current had heaped one upon another. Even in the very heads of these creeks the boulders were rounded by the action of water, and in the soil itself stones of a similar water-worn character might be traced.

On several occasions I came upon heaps of water-worn rocks, weighing from a few pounds to several tons, piled in great masses upon the tops of some of the smaller ridges, leading to the supposition that at one period the whole of this region was submerged. Another small stream, whose course we followed for some distance, flowed over a bed of hard doleritic rock. Late in the afternoon of the 14th we arrived at a new Caribisi settlement on the Waiari creek, a tributary of the Barama river. Here we obtained provisions and carriers, who took us to their principal village on the same creek—which settlement consisted of some six houses, surrounded by a fine clearing abundantly stocked with cassava, yams, sugar-cane, pineapples, guavas, water-melons, lime-trees, cotton, etc. The means of communication between the Indian villages overland is by trails through the forest, which are, in many cases, so indistinctly defined that only the practised eye of an aboriginal could detect and follow them. Often the bush is not even cut, only a twig being bent down here and there to indicate the track.

In company with the head man of the settlement, we re-crossed the Waiari creek and the Wakenamo creek, and at midday stopped at a settlement on the Kwematta creek, which has three considerable falls. Our guide volunteered the information, that at its head is a high mountain with a lake on its summit, reported to be the haunt of the Di-di (a fabulous creature of Indian superstition). It is also believed that the fish inhabiting its waters are poisonous. I made an unsuccessful attempt to find this hill, but met with very lukewarm support from my companions, with whom it had a bad reputation.

From the Kwematta settlement I followed the creek to its junction with the Barama, and, being fortunate enough to obtain two bark canoes, went down the Barama river to the settlement of Arrosiko, on the right bank (situated below the junction of Unama creek with

Barama), which is the starting-point of the Indian trail to the Kuyuni river. Near the mouth of the Kwematta creek, I met with the most extensive brakes of the small-leafed variety of bamboo I had yet seen.

From Arrosiko our road led us along the banks of the Unama creek (here about 60 feet wide), until we reached the settlement of Turroturro, where we found six men, and the usual complement of women and children. They were all painted in a most extraordinary fashion, one man's face being a study in Roman figures done in red paint, while a woman had a patch of the same colour encircling her mouth, with lines running back to her ears, which gave her the appearance of wearing a red respirator.

As we neared Akarabissi creek, the character of the ground again changed from flat to undulating, with hills from 100 to 150 feet above the flats, and 400 feet above sea-level. Our roads joined the Akaribissi creek where it was about 20 feet wide, and coming from the north. We followed it down-stream, our track constantly crossing and re-crossing it over the trunks of fallen trees. I decided to camp where I was, in order to make my wood-skin canoes. After a delay of two days, we launched our self-manufactured boats and started down the creek; but we soon discovered that our journey was not to be an easy one, as the water had fallen considerably, and the bed of the stream was a network of sunken timber, making it no easy task to navigate the canoes through the many obstacles which blocked the passage. At last, after endless trouble, we arrived at the Kuyuni river.

Inexpressibly delightful indeed it was, after having lived for weeks in the perpetual gloom of the forest, to emerge into the glorious sunshine, and to see once more the open sky above us, and the magnificent island-studded river stretching east and west as far as the eye could reach. Even the unemotional Indians with me were stirred to some show of feeling by our change of surroundings.

After leaving Akaribissi mouth, I proceeded up-stream to the mouth of the Morawan creek.

After several days' delay in search of food, we started up the river. Early on the third day of our journey we passed the Kurumu river coming in on the left bank (called by the Venezuelans, Botonamo). On a tributary of this river is built the Venezuelan town of Tumeremos.

Near the mouth of this river it is reported that the Venezuelans had a fort, but there is no habitation of any kind to be seen now. Later in the day we came to the Kaliaku hills on the right bank. These differed in character from any we had yet met with. In place of the usual thickly wooded sides terminating in a narrow ridge, they had perpendicular fronts scantily covered with bush, and appeared to have a level surface on the top. Their faces showed unmistakable signs of the action of water. Just beyond we passed, on the same bank, a large triangular clearing, which I was informed was the site of a former settlement of the Venezuelans. On the upper side of this flat the turbulent Kaliaku creek enters the Kuyuni. This creek, then in flood, bore down upon its surface masses of white foam brought from its falls just above the junction, whose roar came down to us like distant thunder. A short distance further on, the forest on the left bank showed clearly that at some former period it had been burnt. Might not this be the place referred to by Humboldt as being the most easterly possession of the Spaniards?

On June 10 we reached the foot of the Paragua cataract, and, the river being full, we found great difficulty in handling our canoes, which were extremely frail. Although we accomplished our passage in safety, we had some very narrow escapes.

On the morning of June 13, I awoke to the unpleasant reflection that I had to serve out the last ration, and must therefore reach the Yuruan station that day, or go without food. I explained the situation to the men, and, with so powerful an incentive to push forward, all did their best. We had not seen any human beings for several days, so could not tell what distance we were from Yuruan. The men pulled well, and the stillness of the great river was only broken by the monotonous splash of the paddles; all eyes were strained to catch any sign of the presence of human beings, and so we journeyed on in silence. Suddenly one of the red men in the leading canoe made a sign for all to be quiet. Immediately the paddling ceased, and faintly from the far distance came to us over the water a succession of sounds rising and falling in regular cadence. Each man looked at his neighbour, and, after a moment of anxious listening, shouted simultaneously, "An axe! an axe!" There was no need then to urge them on; each man strained at his paddle as if his life depended on his exertions, for at the end of that axe was there not a fellow-creature?

On arriving at the place from whence the welcome sounds had come, we found a Caribisi Indian engaged in cutting out a paddle. The man could speak Spanish, so from him I learnt that we were only a few hours distant from Yuruan station, and that the rapids ahead of us were insignificant. This we found to be the case, as we paddled through them without any difficulty, and soon after midday came in sight of our most westerly station—a plain frame building surmounted by the British flag, where are quartered an inspector and six policemen. The Yuruan river and its tributary, the Yuruari creek (both of which are a succession of cataracts), enter Kuyuni on the left bank exactly opposite the British station.

On the Yuruari creek are situated the Venezuelan mines of El Callao, Peru, Chile, Panama, and many others, and the discoloured water flowing from their stamp mills passes down the creek to the Kuyuni. The surrounding country is undulating, and the forest near the settlements on either bank of the river has evidently been burnt at no very distant date. Outside this area it abounds in balata (*Mimusops balata*) and locust trees (*Hymenæa courbaril*). As regards the British station, both site and building leave room for improvement. As far as I could judge from information obtained from those resident in the district, it is a fairly healthy one.

From here I made several expeditions, and visited the officer in charge of the Venezuelan outpost, who received me most courteously. Their station consists of three or four thatched adobe houses, surrounded by clearings well stocked with provisions and pasture for the cattle, and for the mules and donkeys which are used for carrying freight and for riding. There is a very good mule-track, connecting the station with the town of Tumeremos, about 30 miles distant, from whence they draw their supplies. This mule-track is now being opened out into a cart road, and telegraph communication is being put up to connect the station with Caracas, *viâ* Tumeremos. This made me, as an Englishman, feel considerably mortified to think that it takes our Government from five to six weeks to reach their frontier station, whereas the Venezuelan outpost was then being put, and by this time probably is, in direct communication with their capital by road and wire. Also, whereas it costs our Government an immense annual sum to maintain their small number of police at Yuruan on salt and tinned provisions (sent all the way from Bartica Grove, on the Essequibo, in paddled boats), within 200 yards on the other bank of Kuyuni is the Venezuelan outpost, supplied with all kinds of fresh food from their cattle farms and plantations.

I found the Venezuelan officials ready to accommodate me in every way, and from them I obtained fresh beef for my return journey, on which I started on the 19th. Our passage down the rapids was not destined to be by any means an easy one.

After much damage to our canoe, sometimes running the risk of total wreck in the rapids, and after much delay through darkness and rain, we reached Kaliaku in safety soon after midnight on the 20th. On the 22nd we landed at the mouth of a small stream called Kalaraparu, on which is a settlement of Caribisi Indians, from whom we obtained a sufficient supply of cassava bread for our return tramp overland. The remainder of our journey down the Kuyuni we accomplished with little difficulty.

On June 27 we bade farewell to our dilapidated canoes, and started on our land journey from Takutu creek. The road led us at first over flat ground, becoming more hilly as we left the river behind us. After passing the village of Takutu, we continued our journey to Simiriundui, at the head of the creek, which rises in a spur of the Imataka mountains, over which we crossed at an elevation of 450 feet above sea-level. We followed this ridge for a short distance to the source of the Unama creek, a tributary of the Barama river. A few hours' walk from

Unama Head brought us to the track cut some months before by the Government, from the Barama to the Akaribissi creek. Our road followed the banks of the Unama creek over very broken country, rising from 150 feet to 350 feet above sea-level, to the village of Turroturro. From this point I returned to the Barima by my original route (with the exception of a short walk overland from Arrosiko on the Barama to the village of Kwematta), and arrived at Arawatta on the Barima, my original starting-point, on July 8, after an absence of nine weeks and five days, during which I had proved beyond doubt that the Yuruan frontier station can be reached in fourteen days from Georgetown at the present moment, by steamer to the Barima falls, on foot overland, by the route I have opened, to Kuyuni, and in paddle-boats up that river.

If a railway were made to connect the Barima with the Kuyuni, and a steam-launch put upon the latter river, the frontier could be reached in four days from Georgetown.

On July 9 I loaded my boat with the provisions I had left behind in the Indian's house, and at midday started up the Barima river. A short distance above Arawatta the Whanamo-paru Creek comes in on the left bank, and the Whanna on the right bank, after which the river narrows considerably. As it was then in flood, we had such difficulty in pulling against the stream, that I was reluctantly forced to camp early on the following day and wait for the rush of water to abate. To my great relief next morning, I found that the river had fallen 3 feet, and we were therefore able to resume our journey under more favourable circumstances. On the 12th we reached a group of falls, where we were compelled to unload and haul over the boat; after passing these, the riverside store-houses of the first placer workings came into sight on the right bank, and at nightfall we camped at the foot of more rapids. At daybreak the empty boat was dragged over these, reloaded, and started afresh.

We then paddled on with little difficulty until we reached the Harrison falls, the most dangerous the gold-diggers' boats have to pass at present. Here the river is precipitated over a shelf of rock with a drop of 5 feet into a narrow channel running at right angles with the stream, making it most difficult and dangerous to pass the boats over. On the right bank opposite these falls are more store-houses; and on the 14th we arrived at another group of these buildings, the last habitations on the Barima, one hour and a half's walk below Rocky river.

After a delay of ten days building wood-skins, we left on July 24 in three canoes, and, after passing several rapids and the mouth of the Rocky river (the last branch of the Barima marked on Sir Robert Schomburgh's map), arrived at the finest falls we had yet encountered, called by the Indians Baramba. The fall is in the form of a horseshoe, with an island in the centre; between this and the left bank there is a drop of some 12 feet, and on the other side the water rushes over a mass of boulders.

This is the highest point reached by the Government expedition sent up to ascertain the truth of a report made by the Indians, that the Venezuelans had passed through here on their way to Kuyuni. On a tree on the right bank are cut the letters " V.R." surmounted by a crown, which, until I passed, was supposed by the miners in the district to be the mark indicating the boundary. On the 28th we passed a creek called Kaliaku on the right bank, which was very little smaller than the Barima itself, and soon after this came to the highest point as yet reached by prospectors for gold.

Three days afterwards we decided to make the rest of our journey overland, as the river had become so small and shallow that we had continually to get out and wade, pulling the canoes after us. As soon as our tents were pitched on the right bank, and the canoes unloaded, I and two men started overland, cutting a due west compass-trail. After about 4 miles of this laborious work, still continuing cutting, we followed the river, which here flows between high hills, and on August 2 came to the highest falls on the Barima, a lovely spot, where the water shot over a ledge of doleritic rock 40 feet in height, falling in beautiful cascades into the basin below. Knowing that if the head of the river was not reached that night, there would be no chance of doing so next day (as our last ration was expended, and we were a long distance from our boats and main supply of food), that same afternoon at three o'clock, whilst my companions prepared the camp for the night, I continued my exploration up the narrow valley. At 4.30 I arrived at my journey's end, and the head of Barima, which rises in a steep gorge, at the head of which, on the ridge of the Imataka mountains, at 950 feet above the sea, I cut " V.R." and a crown on a large tree, marking several others, and cutting down a few saplings, to leave unmistakable signs behind me that the spot had been visited by an Englishman.

So the question as to where the river rises, and what manner of country it rises in, is settled. Instead of its source being in savannah as reported, it is in heavy forest, and there is no indication of any living being having visited it before.

On August 4 we re-loaded our canoes and started down-stream, little thinking what was to befall us on our journey.

The river had lowered, and the obstructions in the channel had therefore increased. Early in the day, on turning a sharp bend, one of the boats struck against a sunken tree, and went to the bottom with all on board.

After a long delay we regained most of the cargo, and continued our journey, passing several creeks in flood, which swelled the river considerably. Suddenly the foremost canoe, in which I was, capsized. I just scrambled out on to a tree in time to see the second canoe carried down by the stream on to the top of the sinking one, and both go to the bottom, with five of my companions and all my worldly possessions, with the exception of some clothes, a little tea and coffee, some rice, and an old kerosine-oil tin, which were in the third canoe! After some difficulty we succeeded in regaining our canoes, to one of which was attached the tent. The morning after this catastrophe, breakfasting hastily on the rice (to which the improvised saucepan imparted its own peculiar flavour), we continued our way back to civilization, keeping a sharp look-out for any kind of game, and were lucky enough to shoot a water-hass, or river-pig, which we cooked at the first convenient landing-place. We pulled on until late in the evening, and at 6.30 arrived at the Baramba falls, over which we passed our canoes, and camped at their foot, encouraged by the thought that, if anything went wrong, it would take only four or five hours' good walking, and a swim across the Rocky river, to put us once more within reach of food and civilization. We arrived at Morawhanna on August 12, after an absence of sixteen weeks.

At the conclusion of the meeting, the PRESIDENT said: Mr. Dixon has done some extremely valuable work in helping to settle the future boundary to be demarcated between British Guiana and Venezuela, and has gone through much greater hardships than he has described; and I believe Mrs. Dixon had the heroism to accompany him in his journey. We have to thank him very much for a most interesting paper on one of the finest countries for observing tropical vegetation that exists.

MR. DIXON'S MAP.—The following maps have been used in the compilation of the map of "Part of British Guiana and Venezuela:"—Admiralty Chart, No. 1801; Sir R. H. Schomburgk's Map of British Guiana; Codazzi's Mapa Fisico-Politico de Venezuela; Bianconi's Carte de Venezuela. The map of the Barima River has been constructed from a compass survey by Mr. G. G. Dixon, in which the distances were estimated and checked by time. The lengths of the tributary streams, with the exception of those followed up by Mr. Dixon, must be considered as roughly approximative. The heights of the ridges are from aneroid readings.

A JOURNEY ROUND MELVILLE BAY.

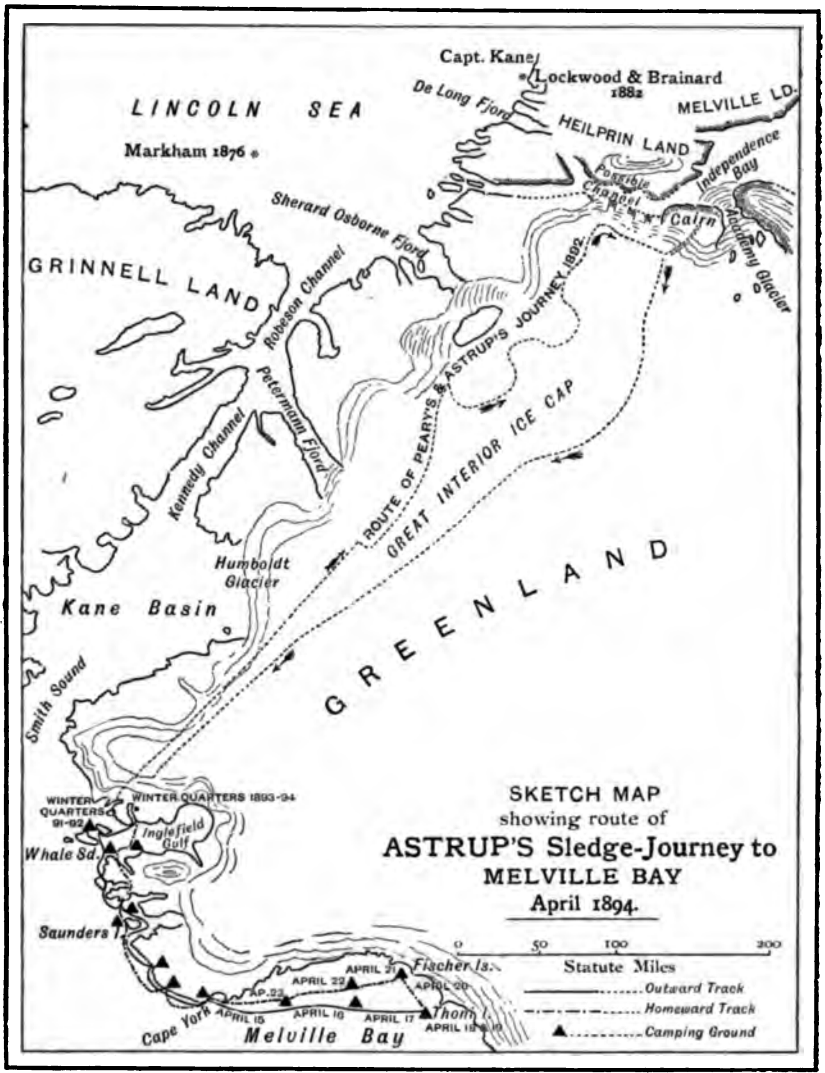
By EIVIND ASTRUP.

As a member of the second Arctic expedition under the command of Lieut. Peary, I had an opportunity last spring of undertaking a sledge journey from the winter quarters of the expedition in Inglefield gulf, on the west coast of Greenland (77° 45′ N. lat.), to the unknown shores of Melville bay. This journey, which was the longest sledge trip made during the last season in the Arctic regions, resulted in a few geographical discoveries, which I will now proceed to explain.

Before I enter into the description of the journey itself, I will say a few words regarding my outfit, which, I am sorry to say, was for many reasons somewhat defective. Of instruments, I had a so-called railroad compass, with which horizontal as well as vertical angles could be taken, a thermometer, a watch, a pocket-compass, a pair of field-glasses, snow-goggles, charts, tables, etc. Of provisions we had a small quantity of tea, sugar, pea-soup flour, army bread, and bacon; besides two rifles, fifty cartridges, and a small native stone lamp for a blubber fire, alcohol or kerosene being at that time unobtainable from the stores of the expedition. Further, I had a few deerskins, a hatchet, and finally some extra rabbit-skin stockings and kamiks (sealskin boots). As regards my meat-supply, I was obliged to rely in this respect entirely on the game I might find on my way. I therefore secured before my departure, as my companion, an exceptionally skilled and faithful young native hunter, named Kolotengva. Of dogs I had borrowed and bought from the natives a team of eight strong animals; while our sledge was constructed, shortly before our departure, by my companion and myself on the native pattern, with ivory shoeing under the narrow wooden runners.

On the morning of April 6 everything was ready for a start, and, although the weather was somewhat doubtful with a cloudy sky, and the air, meteorologically speaking, forebodingly mild (3° Fahr. above zero), we got off at about 9.30 a.m. The bay was full of heavy white fog-banks, and a sharp north-east wind swept down over the naked hills behind the head-quarters. The first week of the journey was spent in reaching the starting-point of my investigations, namely, the southernmost of the native settlements of North Greenland, situated at the western headland of Melville bay, Cape York; it is superfluous here to describe this part of our enterprise. On the accompanying map, however, our journey may be followed in its entire length, our route and stopping-places being marked, and the dates during which the different marches were made being given.

About midnight on April 11 we reached the above-mentioned settlement at Cape York, and here we remained during the 12th, 13th, and 14th, partly to give our dogs a rest, partly kept there by stormy weather. Early in the morning on the 15th we finally continued our journey eastward in clear weather, and my plan now was to reach the islands shown on the map to be situated along the shores of Melville bay. From these islands I hoped to get a good view of the unexplored coasts inside of them, in case it should prove impracticable, on account of the condition of the ice, to reach the shores themselves. In the forenoon we passed Bushman island, which is situated about 12 miles (naut.) east of Cape York. Before I reached this island, I discovered that the coast close to the north of us did not belong to the mainland itself, but to two islands, hitherto unknown, of considerable size; thus they made the firstfruits of the comparatively rich geographical harvest which the following day's journey yielded. In the afternoon, as we reached further eastwards, we soon sighted numerous distant glaciers of gigantic size, which I always had anticipated would exist along the north-eastern shores of Melville bay. In fact, all the way from Cape York, and eastward as far as I could see, I found the coast-line continually broken by large and active glaciers. At 6 o'clock in the afternoon we stopped, after having covered a distance of over 40 miles since morning, and built our usual little snow hut for protection during our sleep. We were then almost due south of a black and very conspicuous mountain-wall, a little to the east of Cape Melville, and not over 8 miles from the nearest shore. The ice over which we had travelled this first day from Cape York was very smooth, and quite different from what I



SKETCH MAP
showing route of
ASTRUP'S Sledge-Journey to
MELVILLE BAY
April 1894.

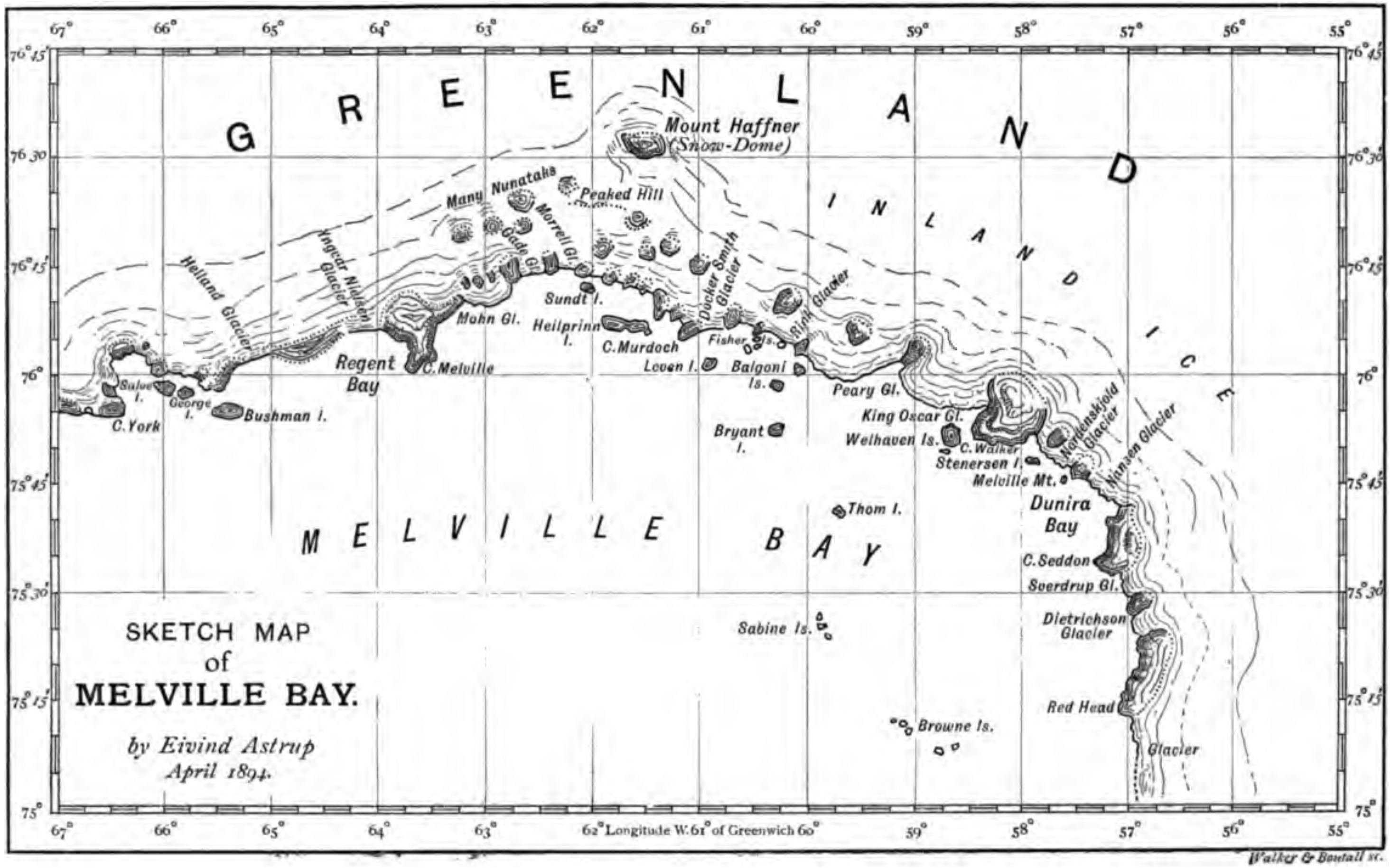
Walker & Boutall sc.

had expected. With the exception of a border of ice about a mile in width, the surface of which was composed of broken and irregular ice-pieces, often reaching a height of from 6 to 8 feet, all the rest of the way was perfectly level and smooth. I noticed, however, that this was largely due to Kolotengva's experience in ice-navigation, as we always seemed to have plenty of broken ice on each side of us, but usually a clear road ahead.

After a night's comfortable rest in our "snow-dome," we continued our journey the following morning at 8 o'clock, in calm but somewhat hazy weather. At noon land could be seen indistinctly to the north-east, but in the afternoon everything was again hidden in mist. We camped at 5 p.m., after having covered a distance of about 30 miles; it was then snowing heavily. That day also we had very level ice, but the sledge did not run quite as easily over the sand-like snowdrifts and through the loose snow we had now come into. When we started the next morning, we found that a few inches of snow had fallen during the night. The weather was still hazy, so no land could be sighted during the early part of the day; but at noon, just as everything looked most gloomy, the fog suddenly cleared away and revealed to us a grand and impressive scene. High dark mountains, gigantic glaciers, and lofty, bluish-tinted snow-peaks, all illuminated by the brilliant rays of the sun, lay scattered along the horizon in wild disorder, forming together the attractive picture of Melville bay.

By following the east-south-east course which we had entered on the same morning, we reached, in the afternoon at 6 o'clock, a small lonely island, where I decided to stop a day for surveying purposes. This island proved to be identical with Thom island on the map, and had in its centre a cone-shaped rock-formation, 300 to 400 feet high, which would afford an excellent spot for a series of bearings to the mainland. After another comfortable night's rest in a snow-house, we awoke and found the day perfect for the purpose we had in view. The air was unusually clear, and the most distant cliffs could be seen with remarkable distinctness. I got a good observation of the sun, and also all desirable bearings to different points on the shore. The latitude given to this island on the map was 75° 40′, while my observation gave nearly the same result, or 75° 41′ 44″. The compass variation I found to be 88½° W. I also drew a profile of the shore-line, including several new islands.

While I was occupied ashore in this way, my native companion was out seal-hunting, as we needed both meat for ourselves and the dogs, and blubber for our cooking-stove. He succeeded in killing a medium-sized specimen in less than an hour's time. Through my field-glass I watched him creeping up to the animal, until at last it looked as if he could touch the seal with his hand, from which position he fired and killed it.



SKETCH MAP
of
MELVILLE BAY.

by Eivind Astrup
April 1894.

Walker & Boutall sc.

Of the 130 miles of coast-land between Cape Melville in the north-west and Red Head in the south-east, which I could overlook from the summit of the little island, upwards of 90 miles consisted of large and small glaciers, all of which, without exception, I judged to be very active ones, as well on account of their broken and irregular surface as on account of the enormous number of icebergs which everywhere were visible along the coast. When to the glaciers which I could overlook from Thom island are added the glaciers which I found between Cape Melville and Cape York, and, further, the colossal-ice stream the northern part of which could be indistinctly seen to the south of Red Head, and which probably extends almost unbroken down to the regions of Devil's Thumb, this great number of ice-rivers make together a total moving mass of ice of nearly 150 miles in width. They form a tremendous outlet for the great interior ice-cap, and are, of course, of great importance to the economy of this vast ice-sheet. The glaciers of Melville bay form in reality the largest successive series of ice-rivers hitherto found in Greenland.

Most of these glaciers are situated exceptionally close to each other, and as to some of the larger ones—as, for instance, King Oscar, Peary, and Rink glaciers, or Nansen and Nordenskiöld glaciers—the land interruptions which separate them are so comparatively inconsiderable that in reality they might as well be considered as two immense giant glaciers.

In regard to the geological character of the coast-land itself, which here and there projected through the icy crust either as imposing capes and forelands or as lonely "nunataks," further back from the coast, nothing of unusual interest could be discovered, although there is doubtless here, as everywhere in North Greenland, an open and productive field for more detailed scientific investigation. The trap formation, with its gloomy colour in sharp contrast with the white snow-domes, appeared to be of frequent occurrence, while the coast in general was, as usual, of archæan structure. The steep bluffs of the coast-land nearest to the sea-ice had a regular height of a couple of thousand feet, while the land in the background, wherever there was any, rose up to a considerably higher elevation. Thus the dome of Cape Walker had without doubt an altitude of over 3000 feet; while a lofty snow-covered dome, at least 15 miles back from the coast-line, and which I named Mount Haffner in honour of the President of the Norwegian Geographical Society, Colonel Haffner, had the appearance of being not less than 5000 feet high. At Cape Melville there was quite a large area of low land, but of what nature it was I was unable to make out in the distance.

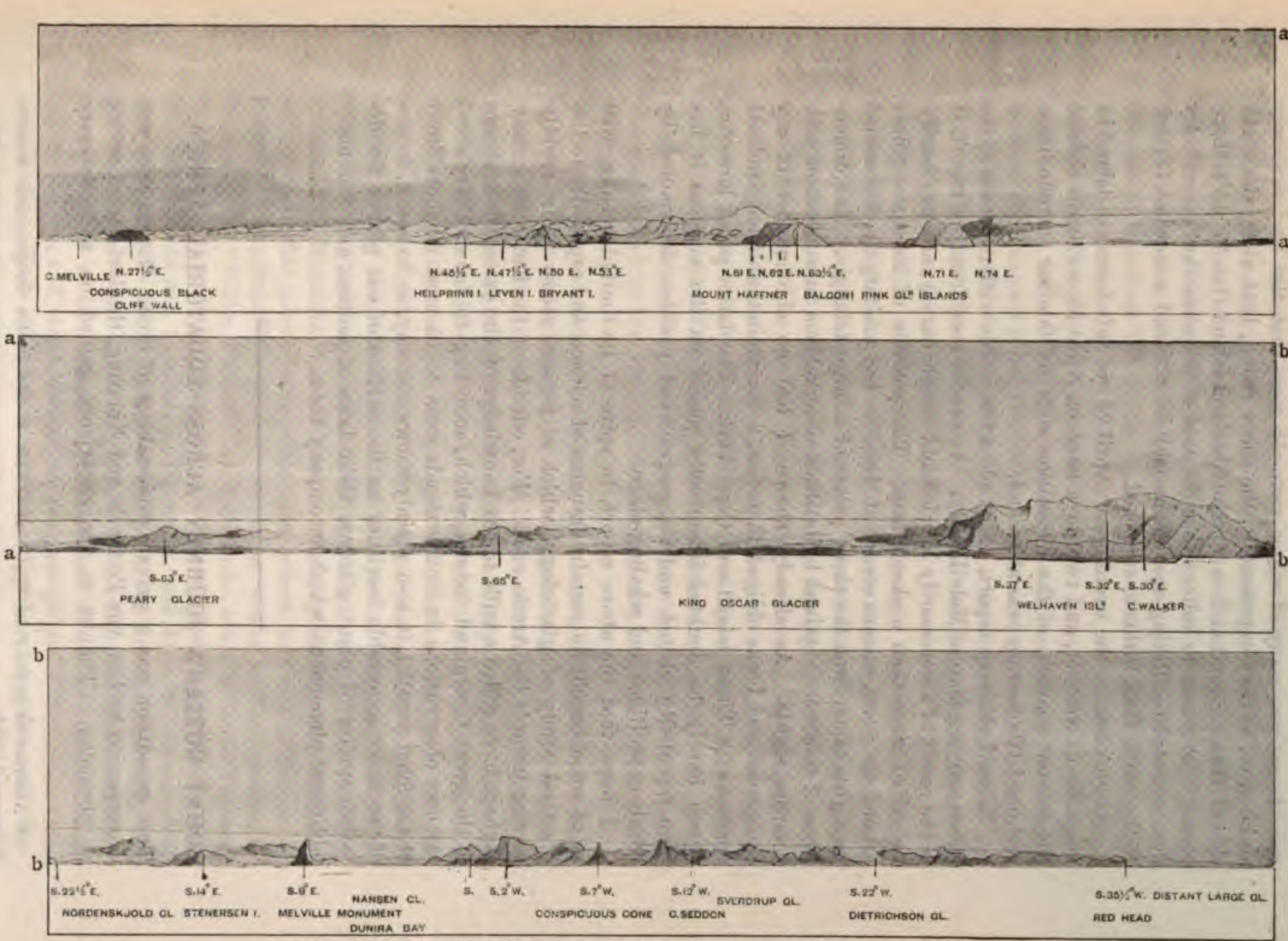
When I had finished with my observations on the island, I built a small cairn on the summit, and placed in its centre a tin can, containing a few notes regarding my journey.

When we looked out the following morning at 5 o'clock, the weather had changed entirely. A strong southerly gale was blowing, filling the air with drifting snow. We had, therefore, to spend the day indoors, which would have been unpleasant enough for me but for my native companion, who told me many interesting facts illustrating the extreme pluck of these people during their hard existence in this remote region. Among other things, he told me that the bear-hunters of the tribe very frequently went over to the east side of Melville bay, and also that the present condition of the ice for sledge-travelling was not exceptionally favourable. Judging from my own experience in Melville bay, and, further, from the information I have gathered from the natives, but principally from what I have seen myself of the travelling ability of the Whale Sound natives, which is truly remarkable, I believe that there is no reason why they should not be able to communicate every year regularly with the most northern Danish settlements, if the necessary inducements were at hand. It would perhaps, in certain seasons, necessitate over-land travelling in one or more places; but, as their supposed superstitious fear of the inland with its great ice-cap does not exceed that of the average white man, this circumstance would be no serious objection to the practicability of the journey. It is true that their hunting and exploring trips have hitherto been limited to the more northern part of Melville bay, but, according to their own statements, this is by no means, as supposed by certain previous authors, caused by the numerous glaciers or other imaginary hindrances, but solely by their perfect ignorance of the close proximity of their long-lost southern brethren.

Next morning, April 20, a strong wind was still blowing from the south. Once more we were almost without meat and blubber, therefore we did not consider it advisable to move farther away from Cape York, which we might have done had the weather been more favourable. Instead of this, we now directed our course towards the north-eastern, and wholly unknown corner of the bay, where I expected to find much of interest, and also hoped to meet with good hunting luck. We started at 7 o'clock in the morning, with the course directly for Cape Murdock, that is the distant bluffs, which, according to the map, I considered to be this cape. As I got near, however, I discovered that these steep cliffs were nothing but a lonely nunatak, situated far in the broken, irregular surface of an imposing glacier. At 1.30 p.m. we reached a little island, which on the inside almost touched the glacier face. As the place commanded a good view of the surrounding country, and as the fog which we had encountered in the morning had mostly cleared away, I told Kolotengva to build our usual little snow-house near the beach, while I took the instrument and ascended the 300 to 400 feet high summit of the island, to get a few compass bearings. After a while I was visited by Kolotengva, who also wanted to get a good view of this desolate corner of the great ice-fields of Melville bay ; but even to the modest native this place seemed to offer no attraction. He shook his head dubiously, and said with the fulness of conviction, "Pujungitoksua nuna manni" ("This land is no good"). The rocky ground was everywhere covered with large snowdrifts, swept down by the frequent winds from the near glaciers. Here and there, where the rocks projected through the snow, the old markings of former glacial activity could be observed. The sights I got were not many, on account of the returning mist; therefore I soon returned to the igloo, marking the summit with a small mound of the few stones that could be found.

The following morning, soon after our start, we succeeded in killing a large bear, the meat of which was received with equal gratitude by ourselves and our dogs. Our course now went directly for an island about 10 miles west-south-west of yesterday's camp, where I stopped a couple of hours to get an observation of latitude, and also a set of bearings, as the weather now had become perfectly clear. At 5.30 in the afternoon we made camp, after an interesting but very toilsome day. We covered a shorter distance during this march than usual, or about 25 miles, as the snow had been deep and soft, and the going heavy.

The following days, April 22 and 23, during which we enjoyed the best of weather, brought us safely to Cape York. Here we remained the next two days, as the weather was stormy and the dogs needed some rest. On the 26th, at 6 a.m., we resumed our journey, no longer alone, but in company with thirty-five natives, with eight sledges pulled by forty-five dogs. In other words, it was the whole Cape York colony on the road, each family with their complete outfit of skins, harpoons, stoves, children, and meat. Before night, however, many of them had left us, pitching their tents at different places along the coast. We spent the night at the head of a little bay running in to the west of Conical Rock. Here we also remained the following day, starting late in the afternoon to take advantage of the night for travelling. We advanced very rapidly, reaching the western end of Saunders island at four o'clock in the morning, where we made camp. On the south side of the island we passed that night an Eskimo settlement named Akpan, which was, however, deserted at the time. Yet I mention the place, as there are here, as well as on the mainland right opposite, on the south side of Wolstenholm Sound, old stone huts, which long since have been abandoned by the natives on account of the intruding sea-water, while afterwards new huts have been built further in on the beach and at a higher elevation. Similar signs of a sinking coast-line were noticed somewhat further to the south by Dr. Kane, who supposed the axis of the movement of oscillation to which the whole Greenland mass is generally believed to be subject to be situated somewhere to the south of the 77th parallel. According to the fact just stated from Saunders island, and judging also from reports confirmed by a great number of


a
a
C. MELVILLE
N. 27½° E.
CONSPICUOUS BLACK CLIFF WALL
N. 46½° E.
N. 47½° E.
N. 50 E.
N. 53° E.
HEILPRINN I.
LEVEN I.
BRYANT I.
N. 61 E.
N. 62 E.
N. 63½° E.
MOUNT HAFFNER
BALGONI
RINK GL.
ISLANDS
N. 71 E.
N. 74 E.
a
a
b
b
S. 63° E.
PEARY GLACIER
S. 65° E.
KING OSCAR GLACIER
S. 37° E.
S. 32° E.
S. 30° E.
WELHAVEN ISL.
C. WALKER
b
b
S. 22½° E.
NORDENSKJOLD GL.
S. 14° E.
STENERSEN I.
S. 9° E.
MELVILLE MONUMENT
NANSEN GL.
DUNIRA BAY
S.
S. 2° W.
S. 7° W.
CONSPICUOUS CONE
S. 12° W.
C. SEDDON
SVERDRUP GL.
S. 22° W.
DIETRICHSON GL.
S. 35½° W.
DISTANT LARGE GL.
RED HEAD

PROFILE OF THE NORTH SHORE OF MELVILLE BAY.

reliable natives, many of whom were old men, that the land is slowly sinking, or, as they expressed it, the water rising, both along the south side of Whale Sound and on Northumberland island (lat. 77° 15′), there seems to be reason to believe that the axis of this somewhat imperfectly demonstrated oscillating movement may be situated somewhat further to the north than hitherto supposed.

At 9 o'clock in the evening on April 28 we left Saunders island in magnificent weather, and two days later, on April 30, we again sighted the winter quarters of the expedition with its familiar surroundings, and our little journey was at an end.

Before I close my report, I will add a few words with reference to the accompanying map of Melville bay. As can be seen from the report, it is the result of a necessarily hurried and rough survey, and can hardly be called more than a sketch-map. The position of its main points around the north-eastern corner of Melville bay are largely determined by sights taken from the three points of a large triangle. The dimensions of this were obtained by latitude observations in connection with compass sights. As already shown, I had no chronometer in my equipment, and I was obliged, therefore, to maintain the old longitudinal positions for Thom island and Cape York. The latter point, however, it can hardly be doubted is correctly placed on the map, as it has been repeatedly visited and its geographical position determined by Arctic expeditions and whaling-ships.

I hope that the above report, in spite of its limited results, will be of some benefit to certain branches of science, and especially to the practical study of glaciology, which at present seems to be rapidly moving towards the Arctic zone. For, outside of the fact that it may perhaps have added a trifle to our knowledge of the extensive drainage of the great Greenland ice-cap, which, according to Lieut. Peary's and my own observations in 1892, extends even to its most northern limit at the 82nd parallel, it also plainly shows the way, so to speak, to one of the most favourable localities on the surface of our planet, for detailed studies of giant glaciers, their laws of motion, and the many additional phenomena which accompany them.

COUNT GÖTZEN'S JOURNEY ACROSS EQUATORIAL AFRICA.*

This expedition was a private undertaking of Count Götzen, who was accompanied by Drs. von Prittwitz and Kersting, the last-named acting as physician. Thanks to the experience gained on a preliminary expedition to Mount Kilimanjaro, such excellent arrangements were made that the whole journey from the East Coast to the Congo lasted not longer than nine months. Owing to strict temperance and a regular mode of living, and especially to the precaution to drink only boiled water, the health of all the Europeans who took part in the expedition was from beginning to end an excellent one. The expedition, which consisted of six hundred porters and two Indian elephants, started from Pangani on December 21, 1893. The elephants, however, had to be left behind shortly afterwards, as they could not be induced to cross the Pangani river; but it is possible that this was a manœuvre on the part of the leaders of the animals, who were afraid of the unknown interior. Two hundred of the porters were Wasukuma, who were engaged as far as Lake Victoria.

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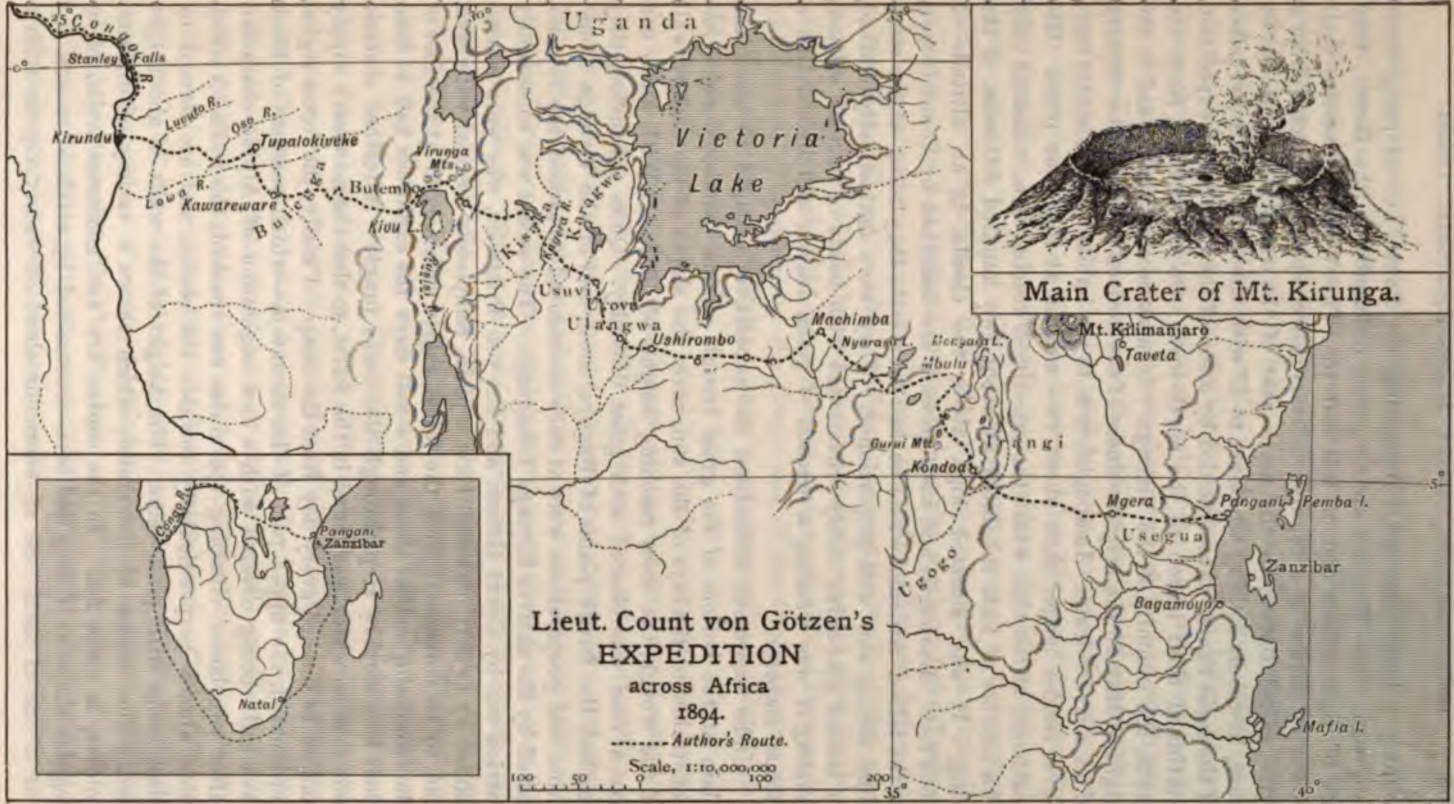
* Abstract of paper read by Count Götzen at the Berlin Geographical Society, February 2, 1895.

The expedition, after having passed through Useguha and Irangi, reached Mount Gurui. An attempt was made to ascend this mountain, the altitude of which was estimated at 10,500 feet; but owing to bad weather the summit could not be climbed, and the highest altitude reached was 9500 feet. The crest of this peculiar mountain has a length of 2 to 3 miles; it is narrow, roof-like, and covered with erica, cyclamen, and long grass. It was remarkable to find, in a high altitude like this, a multitude of elephant and rhinoceros foot-marks. From the mountain a hitherto unknown lake was discovered, called Umburre by the guides, and in the vicinity of the mountain five small crater-lakes were found.

The country consists of undulating plains covered by grass and trees, and abounding with game, whilst in the countries more to the west, *e.g.* on the high plateaux between the great lakes and in the Congo territories, game was found to be very scarce. Between Ugogo and Lake Victoria, Count Götzen avoided as much as possible the routes of previous travellers, and succeeded in obtaining much new topographical information. After a difficult ascent to the central plateau, the southern end of the recently discovered Lake Eiasi or Nyarasa was reached. West of it extend high plateaux, uninhabited and bleak (temp. 39° to 40° Fahr. at sunrise). Nomadic Wandorobbo are the only natives who occasionally camp in this inhospitable wilderness, where only the rhinoceros is frequent. The expedition stayed for three weeks at the missionary station of the "White Fathers" at Ushirombo, south of Lake Victoria, to engage new porters. Ushirombo is a small but independent state. The inhabitants call themselves Wazumba, and form an ethnological link between the Wanyamwezi and the Bantu tribes inhabiting the plateaux further west. The migrations of the Hamitic Wahuma tribes have extended even to these territories, but they have no political influence here, and live, engaged in pastoral pursuits, separated from the Bantu. The inhabitants are intelligent, and were well disposed towards the expedition, assisting them in every possible way in their march through Ulangwa, Uyovu, and Usambiro. On April 20, 1894, the expedition reached the country of East Usuvi, whose chief Kassusura has considerable influence. Here the ascent to the plateaux which extend between the great lakes commences. Three distinct terraces, formed by the prevailing slate formation, have to be ascended. The residence of Kassusura, who keeps a regular army of 2000 to 3000 warriors, is situated at the foot of the third terrace, in the middle of a large banana grove. Proceeding westward, the expedition crossed the Kagera river on May 2, and entered the hitherto unknown country of Ruanda. The kingdom of Ruanda extends at present from the Kagera to the western shores of Lake Kivu, and from Urundi to the Virunga volcanoes. Luabugiri is the name of the present Kigeri of Ruanda. The plateaux are separated by deep erosion-valleys, mostly running from north to south, and covered by luxuriant banana groves. The plateaux, which slope abruptly to the Kagera valley, are without any trees, but everywhere covered with grass. A little south of the spot where the expedition crossed the Kagera, the sources of this river, the Akenyaru and Ruvuvu, unite. Count Götzen considers it most improbable that the Ravuvu is the principal source-river of the Kagera, for the quantity of water above and below the mouth of the Ruvuvu differs very little, and he describes another tributary of the upper Kagera, the Nyavarongo, as even more important than the Akenyaru and Ruvuvu. A lake seems to exist at the spot where the Nyavarongo and the Akenyaru unite, and Count Götzen is inclined to regard it as Stanley's Akenyaru lake.

The plateaux of Ruanda have an average altitude of 5500 to 6500 feet. Its highest points lie in the western districts, where altitudes up to 9800 feet occur, and immediately afterwards the plateaux slope abruptly to the gigantic trough in which the lakes Tanganyika, Kivu, and Albert Edward are situated. The Kivu lake (alt. 4900 feet), which was discovered by the expedition, forms the highest part of this trough, the altitude of the Albert Edward lake being only 3150 feet, and that of the Tanganyika 2660 feet. North of the Kivu lake rise the interesting Virunga mountains, which form an isolated volcanic group, without any connection whatever with the walls of the trough. This mountain group divides the trough into a northern and a southern half.

Without encountering any difficulties, the expedition entered Kisaka, and was well received by the population. This eastern province of Ruanda is a beautiful and very fertile country, well adapted for agriculture and cattle-rearing. There are no villages in Ruanda, but only single houses and farms. A remarkable feature is the total absence of wood, grass being commonly used as fuel. The agricultural population of Ruanda are a Bantu tribe, related to the Warundi; but the reigning race are the Wahuma, or Watusi, who immigrated into the



Lieut. Count von Götzen's
EXPEDITION
across Africa
1894.

Main Crater of Mt. Kirunga.

country a long time ago, subjugating the Bantu, but adopting their language. The Wahuma are altogether different from the Bantu; they are of light colour and of tall stature. The Wahuma exercise their power by means of a regular military force, specially selected from a tribe called Batwa, in the north-west of the country. These Batwa have, however, nothing whatever to do with the equatorial dwarf tribes of the same name. Accompanied by a son of the Kigeri, the expedition continued their march to the north-west. On the horizon, far to the north, the summits of the Virunga volcanoes became visible, and in the night of May 26 the bright redness of the horizon indicated the vicinity of an active volcano. Luabugiri, true to the habits of his nomadic race, never resides longer than about two months at the same place. His residence, at the time when the expedition reached him, consisted only of a number of huts inhabited by about two hundred followers of the king. It was situated high above the clouds, in an altitude of 9800 feet. Luabugiri and his followers are described by Count Götzen as the tallest Africans whom he had ever seen, they being at the same time strong and well-proportioned. They were fantastically clothed in tanned goat-skins, richly ornamented with beads of various colours. Luabugiri was wearing a wreath of green leaves, and looked like a Roman emperor.

Under enormous difficulties, the expedition managed to reach the plain at the bottom of the great trough. Dense bamboo forests, impenetrable to the rays of the sun, cover the slopes of the eastern wall of the trough, the trees reaching heights of 65 feet. With knife and axe a road was cleared with great difficulty. Quite exhausted, they reached the fertile plains of Bugoye, south-east of the Virunga mountains, and preparations were at once commenced to ascend the volcano, called by the natives Kirunga Lchagongo. The ascent was successfully carried out by Count Götzen and Dr. von Prittwitz, who were accompanied by twenty porters. First a plain, completely covered with lava, had to be traversed; then the forest region commenced at the foot of the mountain, and for three and a half days the explorers had to force their way step by step through the dense jungle. A further obstacle was that no water was found in the forest, so that the necessary supply had to be fetched every day from the camp. Finally, the forest region terminated, the upper part of the mountain—which consists of black lava soil—being covered with a low vegetation of Alpine character. After two hours' climbing the crater was reached, the walls of which slope almost perpendicularly towards the centre, and are formed by black rocks with pink veins. The height of the walls is about 1000 feet. The bottom of the crater, which shows a variety of different colours, is quite flat. In the centre are two enormous wells, of as regular shape as if they had been constructed by artificial means, and out of one of them rose an enormous cloud of watery vapour with a thundering roar. It took the explorers two hours to complete a walk round the edge of the crater.

The soil on the shores of Lake Kivu consists principally of lava, the spots being still easily distinguishable where the fused masses came in contact with the water of the lake. The Kivu lake is about 50 miles long, and from 18 to 25 miles wide. It is studded with picturesque islands, and the shores resemble those of the Italian lakes. Count Götzen circumnavigated the northern half of the lake with four canoes; but the triangulation of the northern shores, which took up much time, prevented him from exploring also the southern half, and from ascertaining the course of the Ruzizi river, which, owing to the difference (more than 2000 feet) of the altitudes between lakes Kivu and Tanganyika, must be a river of many waterfalls and rapids, a conclusion one would hardly arrive at, judging only from its swampy mouth at the northern end of Lake Tanganyika. Here Count Götzen changed his originally projected route, and, instead of turning to the south to Lake Tanganyika, determined to penetrate through the primeval forest before him to the Upper Congo. After climbing the western wall of the great trough, the slopes of which were likewise densely covered with bamboo, the expedition reached the grass-covered plains and hills of the country of Butembo. The names of the Congo and of the Oso lake were completely unknown to the natives, who were, however, acquainted with the name of the river Lowa.

The difficulties which the expedition had to overcome from here to the Congo proved almost superhuman, as the country was deserted by the inhabitants, and consequently almost no food was obtainable; at the same time the expedition had to ascend and descend innumerable hills, interrupted by slopes and valleys. The only food obtainable consisted of occasional bananas, which were sometimes found near the deserted villages. The vestiges of the slave-raids of the Manyema were noticeable everywhere. The hills of Butembo are covered with long grass (10 to 12 feet high), and forests cover the valleys. The soil consists of clay-slate, and the same formation prevails in the Great Forest and on the upper Congo. The country gradually slopes to the west, and in the Bulegga country, west of Butembo, where the Great Forest commences, the rivers are tributaries of the Congo. Count Götzen refutes the assertion which has frequently been made since Stanley's last journey, viz. that the forests of the Aruwimi region are merely gallery forests along the rivers, and fully confirms Stanley's view that a large and uninterrupted primeval forest exists there. Count Götzen's expedition did not march along the river-courses, and yet the forest was found everywhere. The only disillusion was that it proved much less picturesque than described by Stanley.

The march through the forest was terrible, on account of the want of food, and owing to the innumerable swamps which had to be crossed day after day, and to the insecurity what dangers the next day might bring. But nowhere the majestic grandeur, and the total absence of sunlight, etc., described by Stanley, were noticeable, and Count Götzen is of opinion that it is very unlikely that the Aruwimi forest differs in any essential point from the Lowa forest. Pygmies were not met with.

It is interesting to note that the Watembo and Walegga are people of less than medium height, but the ethnological peculiarities characterizing the dwarfs according to Stanley and Stuhlmann are wanting, and the Watembo and Walegga are no hunting tribes, spears and iron-barbed arrows being entirely unknown to them. A peculiar feature of the Butembo country are its fortified villages, built on the tops of steep hills, and surrounded by fortifications, from which huge stones and blocks of wood are thrown on the heads of the assailants.

Before the expedition reached the Lowa river, they were surprised to find in the forest a large Manyema settlement, named Kaware-ware, inhabited by five thousand men, and surrounded by extensive rice plantations. The chief was friendly, which was probably due to the recent success of the Belgian arms over the Arabs on the Congo. The Lowa is a rapid river with a rocky bed. After having crossed it, they came to Tupalo Kiveke, another Manyema settlement, where they were well received and provided with food. But the worst part of the journey was to follow, viz. between the Oso and the Luvutu rivers (both tributaries of the Lowa). The country had been devastated by the Arab wars, the Manyema settlements were deserted, and the products of the forest were quite insufficient to provide the expedition with food. Starvation was imminent, and a number of porters died by eating poisonous nuts. Arrived at the Luvuto river, their privations were at an end, as banana plantations are plentiful there; and on September 24, 1894, the Congo was reached at Kirundu, where the explorers were well received by the officers of the Congo Free State. Two months and a half later they arrived safely at the mouth of the Congo.

THE "CHALLENGER" PUBLICATIONS.

By HUGH ROBERT MILL, D.Sc.

THE last instalment of the *Challenger* Report has been published, and the record of the work of the greatest scientific voyage ever undertaken is now before us in all the completeness of fifty royal quarto volumes. Even its size commands respect. It is twice as large as the last edition of the *Encyclopædia Britannica*; it contains 29,500 pages of letterpress, illustrated by 3000 plates and maps, and innumerable blocks in the text. When the variety, originality, and permanence of its contents are taken into account, the *Challenger* Report must be acknowledged to be a production worthy of the first maritime nation; a contribution to science so magnificent that it is beyond praise. There is a special satisfaction in noticing that the cramped typography, poor paper, and crude illustrations which cast a gloom over so many of the productions of the Stationery Office are all absent from this book, which may take its place beside the best memoirs of the United States Geological Survey, and fear nothing from the comparison.

An editorial note to the last volume opportunely summarizes the history of the expedition and its publications. In December, 1872, H.M.S. *Challenger* left England, charged with the scientific exploration of the physical, chemical, geological, and biological conditions of the great ocean basins, under the naval command of Captain George S. Nares, and the scientific direction of Professor Wyville Thomson. Of the civilian scientific staff of six, including the director, only three, Dr. John Murray, Mr. J. Y. Buchanan, and Dr. J. J. Wild, survive. The course of the voyage led to a very complete study of the Atlantic, which was crossed and recrossed many times in different directions. From Cape Town the *Challenger* proceeded to Australia by a southerly course, and had the honour of being the first steam-vessel to cross the Antarctic circle. Turning northward, she threaded the island groups of the western Pacific to Hong Kong and Japan, crossed to the middle of that ocean in 40° N., and came southward nearly on the meridian of 150° W. to 40° S.; then visited Juan Fernandez and Valparaiso, passed through Magellan Straits, and returned along the central line of the Atlantic, reaching England in May, 1876.

Over five hundred deep-sea soundings were made; the deep-sea dredge and trawl were used each time, and specimens of water from different depths, and the deposit on the sea-bed, were obtained in addition to the vast collections of marine animals. Tow-nettings for the collection of surface-living organisms were taken continually, magnetic observations whenever it was possible, and meteorological observations and surface temperatures every two hours. On her return the ship was paid off, and is now, as the tail-piece to the last volume shows, a dismantled hulk. But the voyage has made her name immortal, and the *Challenger* will keep her station with the *Resolution*, *Adventure*, *Beagle*, *Erebus*, *Terror*, and all the other exploring ships which have earned for the British navy a glory greater than can be gained in war.

The land-collections were sent directly to the British Museum, but the specimens of marine life, the samples of sea-water from all the oceans, and the deep-sea deposits were stored in the University of Edinburgh until the *Challenger* Office was opened in that city. Under Sir Wyville Thomson, the general plan of the discussions was provisionally sketched out, and specimens were distributed to specialists; and when Dr. John Murray succeeded to the directorship in 1882, the work was pushed forward with energy and enthusiasm until its completion.

By the enlightened policy of Dr. Murray, the discussions of *Challenger* work are extended to include all other available data of the same kind, down to the time when the Report is completed; and many foreign governments have gladly placed their records and collections at the disposal of the *Challenger* specialists.

The fifty volumes were published as they were finished, in no special order, but they may be classed under six general heads.

I. *The Narrative of the Cruise*, of which vol. i. appeared in 1885, bound in two parts, and containing a full account of the voyage. The work at sea, and pleasure-trips or scientific excursions on land, were fully described, with numerous illustrations; and concise summaries were given of the chief results in each department of science, so far as these had then been worked out. A popular edition of the 'Narrative' ought to be published; it would undoubtedly command a large sale. The second volume of the 'Narrative' was published earlier, in 1882, and consisted of the magnetic results and meteorological log, worked up by the naval officers, together with the first two papers by specialists, Professor Tait describing his experiments on the effect of high pressure on thermometer-bulbs, and Professor Renard treating of the petrology of St. Paul's rocks.

Accompanying the 'Narrative,' a large Mercator chart was published with all known depths of the oceans entered upon it, and the configuration of the crust of the Earth under the water shown by contour-lines for the first time with any approximation to accuracy. The concluding volume of summaries carries in its cover three maps of the world in hemispheres on an equivalent-area projection, displaying the configuration of the Atlantic, Pacific, and Indian Oceans respectively, taking advantage of all deep-sea soundings made up to 1894, and naming the various deep areas and shallow plateaux. The allocation of names may give rise to differences of opinion; a few of the names which have already appeared on American charts seem at least as appropriate as those by which they are displaced.

It is a grand geographical achievement of the *Challenger* expedition that the relief of three-fifths of the Earth's surface has been so far elucidated as to allow general maps to be constructed, and the fact that extensive additions have been made to our knowledge since, while vast gaps still remain, only attests the magnitude of the pioneer work.

II. *Physics and Chemistry* occupy two volumes, published respectively in 1885 and 1889, containing seven important memoirs. The late Professor Dittmar, of Glasgow, made a very thorough chemical study of the water-specimens brought home, and wrote an able monograph, naturally from an exclusively chemical standpoint. The principal facts he deduced were, that while his more exhaustive analyses confirmed in a general way Forchhammer's conclusion that the salts of ocean-water had everywhere the same composition, yet at great depths there was a decided increase in the amount of lime salts in solution. He also went deeply into the important question of dissolved gases, and arrived at several definite conclusions.

Mr. Buchanan discussed the use of the hydrometer for determining specific gravity, and published the results of thousands of determinations made on the voyage, embodying the general results in a map. Much controversy has taken place as to the accuracy of the hydrometer for work at sea, but it now appears clear that for the purpose of determining comparative salinity it is an instrument of high precision, observations with which, when carefully taken, are deserving of full confidence. Mr. Buchanan's chemical researches on the voyage were most laborious, and he did much to elucidate the formation of sea-ice.

The deep-sea temperature observations of the naval officers, made with the Miller-Casella thermometers at 258 stations, are represented in a series of curves, the compilation of which forms the basis of all modern knowledge of oceanic circulation. As published, these curves simply record observed facts without commentary or theoretical discussion. Their importance cannot be over-estimated, but it was one result of their success that improved methods of observation have been arrived at through them, so that a new expedition must necessarily prove even more fruitful in the collection of data of this class. How much was done by the *Challenger*, and as a direct consequence of the expedition, appears from Mr. Buchanan's lecture to the Royal Geographical Society, "On the Similarities in the Physical Geography of the Great Oceans," published in the *Proceedings* for 1886 (vol. 8, p. 753). The new knowledge obtained formed an epoch in the records of the physical geography of the sea with which no other can be compared.

Further magnetic results by Staff-Commander Creak included a discussion full of suggestiveness, and urgently requiring to be supplemented by new observations in fresh regions, the interest of which was not suspected until the *Challenger* results were elaborated.

Professor Renard discussed with rare lucidity the petrological collections made on oceanic islands, and showed how the relative ages of the various volcanic rocks may be ascertained, and a great stride made towards a history of the order of appearance of the volcanic islands of the globe.

Dr. Alexander Buchan has discussed the circulation of air and water from a study of the *Challenger* temperature and other observations, illustrating his papers by a series of maps, which form a unique physical atlas.

No comment is necessary on Dr. Buchan's discussion of atmospheric conditions, as his paper to the Royal Geographical Society, published in the *Proceedings* for 1891 (vol. 13, p. 137), has made them familiar to Fellows of the Society. The paper on oceanic circulation, however, is newly published as an appendix to the last volume, and it is one of the absolutely new things which the expedition has produced. There is done for the ocean what is never likely to be done for the air—the plotting of isotherms for planes far removed from the surface. Admiral Wharton has recently called attention in *Nature* to the remarkable constancy of deep-sea temperatures in the same stations at different seasons and in different years. In fact, each temperature-reading below 100 fathoms may be looked on as a true annual mean. Dr. Buchan has gathered all possible data, and has supplemented the work of the *Challenger* by the records of surveying-ships, British and foreign cable-ships, and private exploring-vessels like the yachts of the Prince of Monaco; and he has laid down the results on charts of the ocean in the form of isotherms for the planes of the surface, 100, 200, 300, 400, 500, 600, 700, 800, 900, 1000, 1500, 2200 fathoms, and the bottom, supplemented by maps of surface and bottom salinity. The map of surface salinity would be more effective if coloured in a more logical gradation of tints than that adopted, and the isothermal maps would also have been improved by not drawing the isotherms across water shallower than the plane to which they refer. These, however, are trifling points. Dr. Buchan has only carried his discussion as far as strict logical deduction from his data leads him. He has alloyed the purity of the observations with no mixture of hypothesis, and so his treatment of oceanic circulation does not result in the formal statement of a completely worked-out theory. He contents himself with giving a series of static glimpses without taking the farther step which might show these fused into a moving picture. Yet he has demonstrated many facts of great novelty and interest. Beneath the surface, for example, the North Atlantic turns out to be the warmest of all the oceans, and the focus from which the warmth spreads is the Mediterranean Sea, the undercurrent of hot salt water from which sinks by its superior density amongst the lighter Atlantic water, and carries its warmth on the plane of 800 fathoms southward to the African coast at the tropic of Cancer, westward to the Azores, and northward to the British Islands. Another inevitable inference from the maps is the predominating influence of the trade-winds on the water of the ocean, not on the surface merely, but to considerable depths, so that by far the warmest part of the ocean at 300 fathoms is the great bight between the West Indies and North America, in which the north-east and the south-east trade-winds converge.

The surface of the ocean varies much in temperature, but this variable layer is merely a film resting on the cold mass of water below. At 100 fathoms, the average mean annual water-temperature of the whole ocean is 60·8°; at 200 fathoms, 50°; at 500 fathoms, 40°; at 1000 fathoms, 36·5°; and at 2200 fathoms (which is the average depth of the ocean as a whole), 35·2°. The temperature in the deeper layers is independent of latitude, and seems determined mainly by the cold Antarctic water creeping northward into all the land-bordered oceans from the great open water-ring of the Southern Ocean, which unites them all.

These maps are the basis of all our knowledge, and will be the touchstone of all our theories of oceanic circulation beneath the surface. They could not have been produced even in rough outline but for the work of the *Challenger*; yet they are incomplete, and fatally so in the vast Southern Ocean approaching the Antarctic circle.

III. *Deep-Sea Deposits.*—This section occupies a single volume, but it contains a new science. Dr. Murray had all along been attracted by the problem of the geology of the floor of the ocean, and after the return of the expedition he continued to collect specimens of deposits from deep and shallow seas, receiving the collections made by surveying and telegraph ships in all oceans. These he examined himself from the point of view of their physical and biological character; conjointly with Professor Renard he studied them mineralogically; while Dr. Gibson, Professor Dittmar, and other chemists made exhaustive analyses of different groups. The result has been to arrive at a simple classification of marine deposits on wide general principles, to map out the distribution of these over the ocean floor with approximate completeness, to discover the mode of origin of the more puzzling classes, and to build up a theory of the growth of organic deposits and the formation of coral islands. This whole subject is purely a product of the *Challenger* expedition, and it has as yet scarcely been rated at its true value by physical geographers, although it is a conspicuous example of the purely geographical ends to which a powerful generalizer can turn the special researches of chemists, mineralogists, and biologists.

Dr. Murray divides marine deposits into three classes: littoral, shallow water, and deep sea. These are of two kinds by origin—terrigenous, or land-derived; and pelagic, or formed in the open oceans. The former class merely edge the shores, the finest river-mud being rarely met with so far as 300 miles from land, and particles so large as to be called sand remain close to the shore-line. From this point of view, the whole ocean beyond the 300-mile belt of "territorial waters" possesses a distinct individuality, invaded by no material of land-origin except the mud and boulders carried by drifting ice, the dust which settles out of the air, and scraps of floating pumice from volcanic eruptions. In the few patches less than 1700 fathoms deep, far from land, the remains of relatively large and delicate shells which lived on the surface abound at the bottom, mixed with innumerable shells of dense, nearly microscopic foraminifera and a little clayey matter, the whole receiving the general name of pteropod ooze, from the characteristic shells of pteropods which occur in it. In deeper water no pteropod or other delicate shells are found, and the calcareous meal of foraminifera, closely resembling softened chalk, is called globigerina ooze, from the particular genus of surface-living organism which occurs in largest proportion. At greater depths globigerina ooze is found in which the microscopic shells appear much corroded; and finally, in the deeps or areas more than 3000 fathoms below the surface, the deposit is almost free from carbonate of lime, and forms a stiff red clay composed of decomposed volcanic or atmospheric dust, and those constituents of shells which are not readily dissolved by sea-water.

The process of formation has been clearly shown. Over the whole surface the same shell-bearing creatures die in myriads; their bodies fall continuously as a gentle calcareous snow-shower through the water, which slowly dissolves them. The large thin shells vanish first, and only reach the bottom in shallow water; the dense spheres of the pin-head and smaller foraminifera resist longest, and only the insoluble residue reaches the greatest depth. Thus the excess of carbonate of lime dissolved in the deeper layers of the ocean is readily explained. The red clay forms so slowly that particles of metallic dust from exploded meteorites, which are covered up by the surface accumulations everywhere else, form an appreciable proportion of its substance. In places where silicious organisms like sponges and radiolaria are numerous on the surface, their glassy spicules form a considerable ingredient in the red clay, which, when the proportion reaches a certain value, is called radiolarian ooze. Again, in the cool and less saline water of the Southern Ocean, and in other seas where the water is freshened, the microscopic, silica-sheathed, self-moving plants known as diatoms swarm in such vast numbers that the deposit consists in very large degree of their shells. When the proportion reaches one half, it is fitly described as diatom ooze.

The map of distribution of pelagic deposits shows that red clay probably covers about 51,000,000 square miles of the ocean floor, including the greater part of the Pacific and the deeps of all the oceans; globigerina ooze is spread over about 50,000,000 square miles, extending in the Atlantic, Pacific, and Indian Oceans, from the edge of the terrigenous coast border to the margin of the red-clay areas; while diatom ooze occupies a belt encircling the globe in the Southern Ocean, with a total area of about 10,000,000 square miles. These three kinds of deposits are thus believed to spread over a surface twice as extensive as all the land of the earth. The terrigenous deposits occupy an area of about 19,000,000 square miles, and one of the strongest arguments for the existence of an Antarctic continent is the fact that they border the belt of diatom ooze on the southward, wherever it has been crossed.

IV. *Botany* consists of two volumes, the first by Mr. W. B. Hemsley, dealing with the plants of oceanic islands and their affinities; the second describing the diatoms, by Count Castracane degli Antelminelli. The importance of these minute marine plants has been referred to in speaking of pelagic deposits.

V. *Zoology* has certainly obtained the lion's share of the *Challenger* Reports, the description of the collections occupying forty volumes. It would be unsuitable here to enter into any detailed account of the researches occupying these volumes. They are highly special, and each group is worked out by an acknowledged specialist, forming a text-book of permanent value.

VI. *The Summary* of the scientific results, the appearance of which, on March 11, forms the occasion of the present article, is bound in two volumes, and brings the whole work of the expedition into sight. The opening sentence of the preface shows how the unity into which all the activities of the expedition have combined is, in the view of the director, a geographical achievement. Dr. Murray says—

"The literature of the natural sciences during the past few years exhibits, in a remarkable way, the profound influence our fuller knowledge of the deep sea has had on all general conceptions concerning the modifications the surface of the Earth is now undergoing and has undergone in past geological times. This could not well be otherwise. Whenever science is enriched by a large addition of new facts, a change in theoretical views invariably follows. No complete theory of the Earth was possible so long as we were ignorant of the conditions prevailing over the three-fifths of the globe covered by the waters of the ocean. It may fairly be said that since the discoveries of Columbus, Gama, and Magellan in the thirty years from 1492 to 1522, there has been no addition to the knowledge of the surface of our planet that can in any way compare with that acquired by the *Challenger* and other deep-sea expeditions during the past quarter of a century."

In pursuance of the historical suggestions of the preface, the Summary begins with a profound discussion of the history of oceanography from the earliest time—when the pressing problem was the extent of the oceans—down to the present day. This is illustrated by the reproduction of a number of ancient maps, as well as several large new maps showing the routes of the circumnavigators, from Magellan's *Victoria* to Cook, and, in two plates, from Cook to the *Challenger*.

The Summary which follows takes the form of a concise statement of the observations made, and lists of the fauna, at each of the great observing-stations of the cruise, numbered consecutively from I. to VIII., and from 1 to 354. It is succeeded by a discussion of the bathymetrical and geographical distribution of animal-life, in which several far-reaching generalizations are arrived at.

When dredging at great depths, it was found that few individuals of each species were captured compared with the results in shallow water; but, although life was less abundant, no cases were found when even highly organized animals were entirely absent at the greatest depth. Dr. Murray is inclined to dispute the theory that there is a universal fauna of high antiquity spread over the floor of the ocean in all latitudes, even although the physical conditions are exactly the same. He finds traces of a universal fauna rather at the "mud-line," or zone of depth where the shore-derived sands give place to the finer muds, usually about the depth of 100 fathoms. One of the few hypothetical statements in the *Report* sums up Dr. Murray's view of the history of deep-sea life—

"I am rather inclined to think," he says, "that in Palæozoic times the ocean-basins were not so deep as at the present time; that the ocean then had throughout a nearly uniform high temperature; and that life was then either absent or represented only by bacteria and other low forms in great depths, as appears to be the case at present in the Black Sea. As in the Black Sea now, so also was there, in all likelihood, in Palæozoic times, insufficient oxygen in deep water to support a deep-sea fauna. From many considerations, one is led to suggest that cooling at the poles commenced in early Mesozoic times; that cold water, descending then in polar areas, slowly filled the greater depths, and, by carrying down a more abundant supply of oxygen, life in water deeper than the mud-line became possible. Subsequently migrations gradually took place from the mud-line into deep regions of the ocean basins."

Finally, Dr. Murray records the conclusion he has come to as to the permanence of the great ocean basins, and of the continental areas on which land has been again and again elevated, and again and again submerged.

An index of about 16,000 names of species, and a very copious general index, complete the work, and practically form a key to the whole set of volumes, greatly facilitating reference.

This notice does not pretend to describe the *Challenger* expedition or its work as a whole, but merely to direct attention to the grand accessions to physical geography in which it has resulted. The publications, however, do not represent all the results of the expedition. Dr. Murray and Mr. J. Y. Buchanan have, during the last twenty years, carried out many incidental researches in physical geography suggested by the *Challenger* work, and they have by their example and encouragement led many others in this country to take up researches which, if little spoken of at home, have been fully recognized by foreign geographers. Dr. Murray has received high honours from the Berlin Geographical Society and the Paris Academy of Sciences, and he has acquired for himself abroad a reputation as the founder of a distinctively British school of physical geography.

THE SIXTH INTERNATIONAL GEOGRAPHICAL CONGRESS.

At the fifth meeting of the International Geographical Congress at Berne in 1891, the Royal Geographical Society accepted the responsibility of organizing the sixth meeting in London. Full particulars of the progress of the arrangements for carrying out this resolution may be obtained at the Society's house, 1, Savile Row, where ladies and gentlemen are now being enrolled as members of the Congress. Before mentioning briefly the plans for the forthcoming Congress, it will be of interest to glance at the history of this periodical International Meeting.

In 1869 statues of the great Flemish geographers, Mercator and Ortelius, subscribed for by the people of Belgium, were about to be inaugurated in the towns of Antwerp and Rupelmond, and a general feeling that such an occasion deserved to be celebrated with more than local honour led to the arrangement of an international festival at Antwerp from August 14 to August 22, 1871. After some discussion, the name given to the meeting was "Congrès des Sciences géographiques, cosmographiques, et commerciales," it being understood that the commercial element must be distinctly geographical. The result was eminently successful, many papers of great scientific importance were read, and the advantages of a meeting of geographers of all nations were felt so keenly that a resolution was passed to continue the Congress periodically. At that time, immediately after the Franco-German war, popular interest in geography had revived in a remarkable way in all parts of the continent of Europe. Geographical societies came into existence everywhere, no less than thirty-nine societies being founded in the ten years 1871-80, compared with twenty-two societies existing before that decade. Several University chairs in geography were also established, and the effect on the advance of scientific geography, and on the applications of geography to education, commerce, and national policy, appears everywhere. The second Congress was held at Paris in 1875, under the auspices of the Paris Geographical Society, whose president, M. Ferdinand de Lesseps, presided over it.

The third Congress met at Venice in 1881, and was carried out on a large scale with great ceremony, the King and Queen of Italy being present at the opening ceremonial, while the exhibition of geographical objects organized by the Italian Geographical Society was extensive and of exceptional interest. Complaints were indeed made that the exhibition rather starved the Congress, for many of the most eminent geographers of all nations were engaged at meetings of jurors adjudicating awards, while the sections were listening to and discussing papers.

In 1889 a series of international conferences was held in Paris in connection with the great exhibition of that year, that of geography being afterwards adopted by the Paris Geographical Society as the

Fourth International Geographical Congress. A special feature of that meeting was the presentation of papers epitomizing the geographical work done by the principal nations of Europe during the nineteenth century, many of them accompanied by bibliographies of permanent value.

Berne was the next meeting-place, and there the fifth Congress was held from August 10 to 14, 1891, the short interval being due to the wish of the Berne Geographical Society to combine the Congress with the celebration of the seventh centenary of the foundation of the town. The exhibition was again a very successful feature of the meeting, and was especially rich in cartographical and educational material. It was decided at that meeting that future Congresses should be held at intervals, not closer than three nor wider than five years, and that London should be the next rendezvous.

At previous Congresses state or municipal aid has been freely given, and premises of the most commodious kind have been placed at the disposal of geographers free of charge. No such privileges are obtainable in this country, and everything must depend on private generosity to supplement the grants of the Royal Geographical Society and of a few enlightened City companies, to provide funds adequate to meet the responsibilities of making the Congress worthy of London, of the United Kingdom, and of the British Empire. The subscription of members is fixed at so small a sum (£1 sterling), that the income so derived can scarcely be expected to do more than cover the necessary expenses connected with the rooms for the meetings and exhibition. Accommodation has been obtained in the Imperial Institute, and members of the Congress will receive the privileges of Honorary Fellows of the Institute during the meeting, as well as similar privileges from the Royal Geographical Society and the Royal Colonial Institute.

The experience of the five past Congresses has been useful in showing what features ought to be preserved or developed, as likely to benefit geographical science, and what might profitably be altered. There are no rules to guide the organization of the meetings, the geographical society which undertakes the management being wisely left a free hand in the matter. An attempt will be made to bring all important communications before the Congress as a whole, and to minimize, if not altogether do away with, sectional meetings. Thus the all-round geographer and the eager student will not be sacrificed to the specialist.

The sixth Congress is numbered in continuity with the five meetings referred to above; but since the fifth Congress met at Berne, there have been two great conferences of geographers to celebrate the discovery of America by Columbus, one having been held at Genoa in 1892, the other at Chicago in 1893.

German geographers have for many years held an annual gathering, the Deutsches Geographentag, the twelfth meeting of which takes place at Bremen at Easter, 1895. The French geographical societies also hold an annual reunion. These assemblages have proved of great interest and value, and it is highly to the credit of the German and French geographers that they have heartily promised co-operation in the International Congress also. A second Italian Geographical Congress is announced as taking place this year; and the meetings of Section E of the British Association form an annual gathering in this country the value and interest of which a long history attests.

The Sixth International Congress, which will be held in London from July 26 to August 3 this year, has received the patronage of the Queen and the Prince of Wales, and will be under the honorary presidency of the King of the Belgians, the Duke of Connaught, and the Duke of York, who has consented to preside at the opening ceremonial. The president is, by the custom of the Congress, the president of the Royal Geographical Society for the time being; and a large number of eminent public men and geographers, both British and foreign, have accepted the positions of vice-presidents and members of an honorary committee. The preliminary work has been carried out by an organizing committee, nominated by the Council of the Royal Geographical Society, with representations from the Royal Scottish Geographical Society, the Education Department, the Imperial Institute, the Royal Colonial Institute, and the Society of Arts. This committee includes Major Leonard Darwin, M.P., *chairman*; Mr. Clements R. Markham, C.B., F.R.S.; Mr. D. W. Freshfield; Mr. H. Seebohm; Right Hon. Sir George Bowen; Colonel Sir Charles W. Wilson, F.R.S.; General J. T. Walker, F.R.S.; Dr. R. N. Cust; Mr. E. Delmar Morgan; Mr. H. J. Mackinder; Mr. Cuthbert E. Peek; Mr. J. Y. Buchanan, F.R.S.; Sir Frederick A. Abel, F.R.S.; Sir Henry Barkly, F.R.S.; Mr. Faithful Begg; General Sir J. F. D. Donelly, and Rev. T. W. Sharpe, with Mr. J. Scott Keltie and Dr. H. R. Mill as secretaries. Smaller committees are charged with special work in administering finances, promoting the exhibition, and organizing the social features of the meeting. In their desire to promote a cordial good feeling amongst all their fellow-members of the Congress, the Organizing Committee has consulted the leading geographers of the principal countries with reference to many of the proposed arrangements, and has received valuable help on many points. An international consultative committee will probably be appointed at an early date.

The work of the sixth Congress will include the discussion of the reports made by committees nominated at Berne: one on Professor Penck's proposed map of the world on the scale of 1 : 1,000,000; the other on the question of an international bibliography of geography. Papers will be received for consideration by the Organizing Committee until the end of April, and in special cases, where the subjects and authors of papers have been already intimated and approved, the receipt of the papers may be postponed until the end of May. Each paper must be accompanied by an abstract, not more than 1500 words in length, and they may be written in English, French, German, or Italian, all four languages being on a footing of absolute equality in the discussions.

The heads under which contributions may be sent in practically include the whole range of geography. They are: mathematical geography; physical geography, including oceanography and geographical distribution; cartography; exploration; descriptive geography; historical geography; applied geography, including anthropo-geography and commercial geography; and, finally, geography in education. In a later article this programme will be more fully referred to, and the names of those who have promised papers will be published. Meanwhile, it is sufficient to say that an opportunity, such as has never occurred before in this country, will be presented of demonstrating the importance of geography as a science of high precision and vast extent, rich in results of theoretical interest, and of practical value, which affords an unequalled discipline in education when rightly applied.

In all former Congresses the geographical exhibition has been a prominent, sometimes an overshadowing feature. This year the exhibition will be less extensive than usual, but, although small, it will probably be more representative of the best geographical work of all nations than has ever been the case before. The Paris, Berlin, and St. Petersburg Geographical Societies have undertaken to organize the exhibits of their respective countries, thereby ensuring a good selection critically brought together by those best able to form a judgment. Government departments and private individuals from other countries in Europe, Asia, and America, and from most of the large British colonies, have agreed to exhibit; and our country, which has never been adequately represented in the exhibition of a geographical congress before, may at last be expected to play a worthy part. Lord Aberdare, who was one of the representatives of the Royal Geographical Society at the Venice Congress, devoted a considerable part of his presidential address, at the opening of the session 1881–1882, to a criticism of that Congress and exhibition. He deplored the lack of interest taken by the British Government—although the Indian Government supplied a splendid exhibit—and, after citing the opinion of an Italian writer to the effect that, "If the people of Europe wish to see what treasures are contained in England, they must get up an exhibition in London itself, where, from her natural hospitality, and her pride of pre-eminence, England will take care that her collections shall appear in all their completeness, their originality, and their power," he added, "I confess I hope that time may come."* The fulfilment of this hope is dashed with sadness, and the loss of Lord Aberdare, Sir Henry Rawlinson, and Sir Edward Bunbury within ten days removes at one sweep three honorary vice-presidents of the Congress, all veterans of British geography whom the geographers of the world would have delighted to honour.

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* *Proceedings*, R.G.S., vol. iii., 1881, p. 747.

BARON TOLL'S EXPEDITION TO ARCTIC SIBERIA.

A SHORT account of this remarkable expedition has already been given in the *Journal* (May, 1894), on the basis of a communication made by Baron Toll to the St. Petersburg Academy of Sciences in January of that year. In a paper read before the Russian Geographical Society, in April, 1894, but only now published in the last issue of the *Izvestia* (1894, iv.), Baron Toll, after having described his journey in almost the same terms as in the preceding communication, sums up his researches and impressions as follows:—

"In the middle of the region explored flows the majestic Lena. Its right bank is accompanied by the Verkhoyansk range, which, with the exception of two bends, maintains a nearly meridional direction, up to the shores of the Arctic Ocean. Reaching 7000 feet near the sources of the Indighirka, and 5000 feet at the sources of the Yana, it gradually lowers towards the north, spreading out to a greater width, and attaining but 3000 feet in the Khara-ulakh range. Further on, it disappears under the ocean, but some of its spurs reappear above the surface in 73° to 76° N. lat., forming the New Siberia islands, of which the highest spots, in Kotelnyi Island, do not rise above 1500 feet.

"The geological structure of these chains, both on the mainland and the islands, is the same. The same Silurian limestones, and the same Triassic slates, stretch in the same direction, and the same granites rise on the surface. Only about Svyatoi Nos, on the shores of the ocean, do we find a younger formation of eruptive basalts. The left bank of the Lena is formed by a plateau, about 500 feet high on the average, which is formed, in the upper course of the Lena, of Palæozoic rocks, and below Yakutsk, of Mesozoic and partly Tertiary deposits, identical with the coal-bearing deposits which appear in the New Siberia islands. The Mesozoic deposits had been previously explored, as far as the mouth of the Olenek, by Czekanowski. Now we have had the opportunity of exploring them further north, in the delta of the Lena, and from the mouth of the Olenek to that of the Anabar, as well as up this river to the northern limit of the forests, where the Mesozoic deposits are fringed by basalts, which also form the water-parting between the Anabar and the Khatanga. The Mesozoic formations of the Anabar are of great interest. They contain Jurassic and Cretaceous deposits (Oxford and Neocomian), all of them rich in fossils, and the nearer study of the materials I have collected affords answers to several important questions relative to the history of our globe. Thus they give a positive reply to the question raised by the late Neumayer, as to the existence of several climateric zones during the Jurassic period, and prove that he was right in assuming the existence of a boreal zone of the Jurassic sea round the North Pole. Moreover, the fauna which I have found in the Neocomian deposits permits us now to determine exactly the age of the interesting Mesozoic fossils which had been collected by Fr. Schmidt and Middendorff in boulders only, scattered over North Siberia; they belong to deposits which are widely spread in the Pechora region, and which Payer found on the east coast of Greenland. As to the Jurassic fossils which I have brought back, they settle the exact age of the coal-bearing deposits of Siberia, which contain considerable amounts of fossil wood.

"Post-Tertiary deposits abound in all the valleys of both the plateau and the lowlands. Their most popular representative is the mammoth. It is well known how widely spread mammoth tusks are over North Siberia, and how fabulously numerous they are in the New Siberia islands. And it is also well known that, besides the tusks and the bones of the mammoth, whole skeletons of this animal and of the rhinoceros, as well as of the *Bison friscus* and the *Ovibos moschatus*, are found. But how are we to explain this fact, as also the circumstance that on the New Siberia islands the bones are found in such incredible quantities, and that they are so well preserved that New Siberian tusks often cannot be distinguished from the best ivory?

"In order to answer this question, we must cast a glance on the Post-Tertiary deposits of the Arctic coast. The chief feature of these deposits is, the permanently frozen soil and the layers of underground or buried ice they contain. The largest masses of such buried ice are found on the Great Liakhoff islands, and they have been described some time ago by Dr. Bunge and myself. As to their origin, after my visit to the Liakhoff islands in 1886, I came to the conclusion that these masses, which form the chief solid material of the island, originated during the Glacial period, and that they represent remains of the old ice-cap. But it was asked, Why, if such was the case, have no *roches moutonnées*, striated surfaces, or moraines, and transported boulders been observed? We have now made a further step towards answering the question. In the Bay of Anabar, on the sea-coast in 73° N. lat., I have found a typical moraine; and the bay itself has the shape of a true fjord. Moreover, my studies of the structure of the ice-masses show that they have the typical granulated structure, which fact removes all doubt as to their origin in the snow-covering of the country, as against any other possible aqueous origin. The cliffs of the Great Liakhoff island also proved to be very instructive, as it appeared that the fresh-water sandy clay, which covers the underground layers of ice, contains, together with shells of molluscs (*Cyclas* and *Valvata*), remains of insects, and bones of Post-Tertiary mammals, which prove that this clay belongs to the mammoth bed; also whole trees of alder (*Alnus fruticosa*), willow, and birch, 15 feet high, and with perfectly well-preserved leaves, and even cones. This fact proves to a certainty that during the Mammoth period, the northern limit of tree-vegetation was situated at least three degrees further north than it is now; it was then under the 74th degree, while now it is on the mainland under the 71st degree. We thus fully understand how the meadows, covered with bushes of birches, willows, and alders, which were then connected with the mainland, could afford sufficient food for mammoths, rhinoceroses, etc.

"We also discover a certain law in the distribution of the masses of buried ice. None of them are found to the west of the mouth of the Yenisei, or to the east of that river as far as the mouth of the Khatanga —that is, in the parts of the coast region which were covered by the Post-Pliocene Arctic Ocean. On the contrary, in the region which rose above this ocean, in the space between Khatanga bay and the New Siberia islands, near the mouths of the Lena, the Yana, etc., we find these ice-masses—these remainders of former glaciation. As to the comparative rarity of moraines, *roches moutonnées*, and so on, we must take into account, not only the very rapid disintegration of rocks under the climate of the north, but also the very powerful "deflation" (activity of wind), and the special character of the erosion which takes place in these regions. The rivers of the far North do not erode deep beds, but they continually oscillate in a horizontal direction, and thus their erosive action is spread over a wide surface. This last fact must also be taken into consideration when we discuss the position of the northern limit of forests. The growth of forests depends not only upon latitude and altitude, but also on drainage, which is here as important for the growth of trees as moisture is in our latitudes."

After some interesting remarks on the dependence of animals upon surrounding nature, and their migrations (the lemmings are said by the Lamutes to display a three years' period in their migrations to the New Siberia islands), Baron Toll spoke of the inhabitants of the Tundras as follows:—

"They entirely depend for their living upon these migrations of animals. In the summer they come with their reindeer herds to the sea-coast, and when the fish arrive they go to the mouths of the rivers; while during the moulting of the birds they assemble around the lakes. In the winter they return to the limit of the forests, where they find protection from the snow-storms, and hunt the arctic fox, or fish in the lakes. But part of them remains in the Tundra all the year round, and these know about growing trees only from hearsay. The collection of mammoth-bones plays also an important part in their lives. They find them everywhere washed out of the shores by the rivers and little streams, or even by the waves of the sea. Every year a party of the more enterprising and daring inhabitants of the mainland repairs to the Great Liakhoff island.

"The manner of life of all the inhabitants of the Arctic coast—Yakuts, Tunguses, Lamuts, and, beginning with the Khatanga bay, the Samoyeds—determines their character. Hunting, and especially the search for mammoth-bones, which depends not only on intelligence, but very much on mere chance, give to their character a certain levity and passion for adventure. Their experience that luck depends on mere hazard, maintains superstition and shamanism. On the other hand, we find among the aborigines of Siberia a proof that constant contact with nature maintains in man the primitive and childishly naive goodness of heart. Moreover, the sternness of the nature which surrounds them convinces them of the importance of friendly mutual relations, and they have, therefore, a standard of morality which is astonishing to us Europeans. Murder does not exist in their code, and it is unimaginable among them. It must, however, be remarked that all aborigines, although christened, have less than even a superficial idea of Christianity.

"It is impossible not to love the aborigines of the Arctic coast, and we especially cannot but remember them with a feeling of gratitude for their hospitality and their universally irreproachable relations with us. Therefore, I am bound to mention their unfavourable surroundings. Since the annexation of Siberia, they have been accustomed to pay the tribute without murmur, to pay even for those of them who died long since, and to receive from the merchants bad goods and spirits at a very high price. It is pitiable to see how brandy is all they receive from those who undertake to teach them higher truth."

After having made the remark that the traveller always succeeds in his task when he has taken for his motto the Yakut saying, "Bir äraiz äölökh," *i.e.* "To die all together in loyalty to one's comrades and one's task," and that this motto, adopted by Nansen, will bring aid and luck to his bold undertaking, Baron Toll concluded as follows: "There remains much work for the geographer in the North, both on the mainland and on the islands, whether already discovered, or only seen at a distance. When my guide, Jergheli, told me of Sannikoff's Land, which I myself have also seen to the north of Kotelnyi Island, and which he, who has spent seven summers on the same island, has seen, from year to year, mysteriously rising in the north, and when I asked him whether he would like to reach that distant goal, he gave me the following answer: 'Only to put my feet upon it, and then to die'!"

THE MONTHLY RECORD.

THE SOCIETY.

A Franklin Commemoration.—The Council have arranged to hold a special meeting of the Society on Monday, May 20, to commemorate the fiftieth anniversary of the departure of the *Erebus* and *Terror*, under Sir John Franklin, on that Arctic expedition from which he and his gallant men never returned. It is to be hoped that there will be a large gathering of those who have been connected with, or who are interested in, Arctic exploration. H.R.H. the Duke of York has kindly promised to be present. There may be some other special features connected with this commemoration, which will be only announced to the Fellows.

The Annual Conversazione and Dinner.—A conversazione will be held on the evening of the anniversary of the Society, Monday, May 27, at the Prince's Hall, Piccadilly. The anniversary dinner will take place on Wednesday, June 12, at the Whitehall Rooms. Details will be given in the May number of the *Journal*.

The Oxford Geographical Studentship.—The examiners have this year elected Mr. R. S. Günther, of Magdalen College, as the student to whom the Society's Scholarship is to be awarded. Mr. Günther is to investigate the volcanic region of the Phlegræan fields near Naples during the months of July and August, and of December and January next. His work will consist of—1. An investigation of the relation between the catchment areas of the ravines cut in the slopes of certain of the volcanoes and the depth to which the ravines have been eroded. 2. An attempt at the determination of the relative ages of the volcanic slopes by a comparison of the ravines on their flanks. 3. A determination of the volcanic energy of the region as exhibited by the mass of matter which has been erupted over the region.

Mr. Scott Elliot's Expedition to Mount Ruwenzori.—Mr. Scott Elliot, who has just returned from his expedition to Mount Ruwenzori, will give a paper on the results of his journey, at the meeting of the Society, on Monday, April 8. Mr. Scott Elliot from Mount Ruwenzori traversed the almost unknown region between Lake Albert Edward and Lake Tanganyika, and by the latter lake went on to Lake Nyasa, and home by the Zambezi.

The Society's Prizes to Scotch Training College Students.—The following candidates for Queen's scholarships, under the Scottish Education Department, were successful in obtaining the prizes for proficiency in geography, offered by the Society. MALES.—*Prize of* £5: Thomas Neilson, Shotts. *Prizes of Books:* Francis W. Milne, Gamrie; William Young, Stirling; William Scott, Leith. FEMALES.—*Prize of* £5: Jeannie A. B. Black, Aberdeen. *Prizes of Books:* Alice Watson, Aberdeen; Madge Webster, Aberdeen; Mary Barrowman, Glasgow.

EUROPE.

Desiccation of the Caucasus.—The Caucasian Geographical Society has brought out a volume of memoirs (*Zapiski*, vol. xvi.) of more than usual interest. In describing the country and the flora of Stavropol, M. Akinfieff touches upon the now much-discussed question of the cause of the rapid desiccation of Northern Caucasia. The destruction of forests cannot be of great importance, as they have been cut down long since, especially by the Nogais; but it has been shown by the Kuma-Manyoh expedition that the area of the Caspian has decreased during the last one hundred years by at least 6600 square miles, and what was formerly covered with water is now covered with dry sand, which dries the winds coming from the east. M. Dementieff has himself seen several times during the last ten years, how in two or three days the wind had blown off a layer 5 inches thick of arable soil from the tilled and partially sown cornfields, on areas covering 300 to 500 acres; and in 1884 the Rostoff-Vladikavkaz railway had to be protected by special screens from the black-earth dust which was blown by the winds, and in some places accumulated to the thickness of 2½ feet on the outer side of the screens. Nearly every year the railway has to be protected in the same way. The grass having been removed from the prairies, the dust transported by the wind finds no obstacles to its transport, and immense areas of tilled land are thus denuded of their fertile soil.

The Glaciers of the Caucasus.—The *Zapiski* of the Geographical Society of the Caucasus (vol. 16) contains a detailed description of the glaciers of Svanetia, by N. Zhukoff, accompanied by a map on the scale of 1: 84,000, comprising the great system of glaciers from 60° 28′ to 60° 45′ E. long., and from 41° 58′ 30″ to 42° 13′ 47″ N. lat.: the glacier Tvüber, nearly 7 miles long, which creeps down to the altitude of 6664 feet; the two glaciers Tsanner, of which the largest has a length of 7 miles, and attains the 6838-feet level; and the Adish glacier, which has a length of 5 miles, of which the *névé* occupies 1½ mile, and the ice-fall 1½ mile, and the ice reaches to within 7448 feet above sea-level. The ice-fall is very steep, as it descends in its own length from the altitude of 13,594 feet to 8785 feet. A. V. Pastukhoff describes his journeys to the highest inhabited spots of the Caucasus and his ascent of the Shah-dagh, accompanying his descriptions by four photographs, one of which represents Kurush, the highest inhabited spot of Caucasia, situated at an altitude of 8175 feet. The village Kurush is very interesting. It is situated in 41° 46′ 56″ N. lat., 65° 30′ E. long., on the southern slope of the Shalbuz-dagh, and has no less than 4660 inhabitants. Their chief occupation is, of course, cattle-breeding, and they spend nearly eight months every year with their herds on the winter pasture-grounds; but they also cultivate the soil, and their fields, which are scattered at heights of from 6440 to 8500 feet, are sufficient to supply them with one-half of the cereals they require for food. From Kurush, M. Pastukhoff visited the glaciers of the Kichen-dagh, and ascended the snowclad Shah-dagh, which rises in the north of the main range to the height of 13,962 feet. K. N. Rossikoff's paper on the conditions of the glaciers and lakes of the central parts of the main ridge of the Caucasus contains the data of his measurements, made in 1892. He began, in 1882, to make accurate measurements of the changes which take place in the sizes of several glaciers, and the changes of level in certain Alpine lakes, specially chosen for this purpose. The general result of these investigations is that all glaciers chosen for observation on the northern slope of the so-called Lateral, or Bokovoi, Caucasus range, from the Adai-khokh to the Diklos-mta (Dzana-kort), have been, since 1883–85 till 1892 inclusive, in a phase of decrease. Their lower ends have receded, the thickness of the glaciers has decreased, and the surfaces of the snowfields which feed them have been gradually lowered. The average recession of the snouts of the glaciers has been 51 feet per year, but it varies for different glaciers from 29 to 70 feet. At the same time, the thickness of the snow region has decreased for four glaciers by from 1 to 4 feet per annum. The lakes of the Alpine region, as well as those which lie at the northern foot of the mountains, have also been decreasing during the same period, although in 1892 some of them attained a higher level than before, probably in consequence of quite local causes.

Inland Navigation in Germany.—A very full report by Mr. J. B. Whitehead upon the canals and other inland waterways in Germany, has recently been issued (Foreign Office, 1894, Miscellaneous Series, No. 345). There are three principal divisions of German inland waterways, viz. the eastern rivers, including the Memel, the Pregel and the Masurian waterways, the Vistula, and the Elbing-Oberland canal; the central rivers, including the Oder, the Klodnitz canal, the Bromberg canal, the Eider canal, the North Sea and Baltic ship canal, and the Elbe; the western rivers, including the Weser, the Ems, the Rhine, and the Upper Danube. The length of these inland waterways is given as follows:—

	Length. Miles.		Length. Miles.
Memel	168	Brought forward	2340
Pregel	271	Elbe	1594
Vistula	433	Weser	597
Oder	1362	Ems	567
Eider canal	106	Rhine	1851
		Danube	417
Carried forward	2340		
		Total	7366

Of the above, the canals or rivers converted into canals amount to about 1349 miles. The most important new canals are: (1) the Oder-Spree canal (completed); (2) the Ems-Jade canal (nearly completed); (3) the Dortmund-Ems canal (begun in 1891); and (4) the Elbe-Trave canal. The object of the Oder-Spree canal was to supersede the unsatisfactory communication between the two rivers afforded by the Müllrose (Friedrich Wilhelms) canal, and to allow large barges from the Oder to reach Berlin. The canal was completed in 1891. The new canal leaves the Oder at Fürstenberg, 15¼ miles above Brieskow, which is the entrance of the Müllrose canal. The whole length of the Oder-Spree canal from Fürstenberg to Cöpenick, near Berlin (where it meets the old waterway), is 60 miles. By means of this new canal the whole distance between Breslau and Berlin has been shortened by about 21 miles. The Ems-Jade canal starts from the port of Emden, and runs in a north-easterly direction past Aurich to Wilhelmshaven, on the Jade gulf. Its total length is about 39 miles. The Dortmund-Ems canal is considered a work of great importance, as affording an outlet for the Westphalian, and later perhaps also for the Rhenish industrial and coal-producing districts to the North Sea, and, by the new ship canal, to the Baltic. The scheme includes a large maritime port at Koenigspolder, near Emden, and a lateral canal from Oldersum to Emden. The total length of the canal will be 143 miles. The Dortmund-Ems canal forms the first section of a projected system of waterways which is intended to connect the Rhine with the Ems, with the lower and middle Weser, and with the Elbe, thus affording, in connection with the existing canals between the Elbe, Oder, and Vistula, a complete line of water-communication from east to west through the centre of Prussia. The Elbe-Trave canal is intended to replace the Steckenitz canal, which at present connects Lübeck with the Elbe. The new canal will in general follow the course of the existing one, leaving the Elbe at Lauenburg, and passing through the Mölln and Ratzeburg lakes. The whole length of the canal will be 43½ miles. The recent improvement of the Prussian waterways has greatly affected the conditions of navigation. The main points are the greater size and carrying capacity of the vessels that can be employed, and the development of steam navigation. The Report contains a map showing the navigable rivers and canals of Northern Germany, on a scale of 1 : 2,000,000.

ASIA.

Mr. Theodore Bent's Journey in Arabia.—The following letter, dated "Aden, February 13," has been received from Mr. Bent: "We have reached here a little earlier than we expected, from circumstances which you will see from the following. We spent a good long time in the Gara country behind Dofar, doing the mountains where frankincense comes from very thoroughly, and getting to the borders of the Nejd desert. We found this district exceedingly interesting from several points of view, and as yet entirely unknown to any Europeans. It is exceedingly fertile, and abounds in lakes, streams, and valleys filled with a rich tropical vegetation as different from the Hadramut as anything possibly could be. We found the Beduin tribes here fairly friendly, and had altogether a very good time. We next essayed to get to the Mahri country, but were driven back on two points, and I am convinced that this part of Arabia, under the present state of affairs, is impossible to enter except for a few miles from the coast. We then went on to Sheher, trusting to the promise of assistance there which Iman Sharif had got from the Sultan Nawasjung, whom he saw at Hyderabad. We told them we wished to do the tour they promised to take us last year, when the season was too advanced; but to our surprise they received us very coldly, absolutely refused to let us go outside their town, and told us that for the future no Europeans would be allowed to enter the Hadramut. So I am going to India from here to lay the facts before Col. Holdich. We shall be home about the middle of April, and though we have not done all we wanted to do, yet we are very well satisfied with the piece of Arabia we have done, and the more I see of it the more I am convinced that this portion of Arabia can only be done piecemeal, and a regular journey through from Muskat to Aden is perfectly impracticable."

Dr. Sven Hedin on the Death of M. Dutreuil de Rhins.—In a letter addressed to the *Turkestan Gazette*, and dated "Kashgar, December 21," this Swedish explorer gives some details respecting the death of the French traveller not contained in the letter of his travelling companion, M. Grenard. On December 17, a Cossack who belonged to the expedition, named Razumoff, returned to Kashgar, and as several things in his possession undoubtedly belonged to the French expedition, he was interrogated by the Russian representative at that town. His account is as follows: "We came to Tu-Buda on a rainy day. M. de Rhins, having been refused admittance into the house of one of the inhabitants, ordered us to break open a door which led to a yard, and in this we pitched our tents. Next day we took our horses to a grazing-ground, one verst distant, and two were stolen. Thereupon M. de Rhins ordered us to take two horses by force from the villagers, which we did. When the caravan started, on the third day, it was greeted with threatening shouts, and we had proceeded but a few steps when the inhabitants began firing upon us. M. Dutreuil was wounded in the stomach, and, as he fell he said to me 'Ça ne marche pas.' M. Grenard ran to find the medicine-chest. We were surrounded by some 60 Kalmucks. We were separated from M. Dutreuil, and forced to flee, and I saw him no more." Two natives, who came to Kashgar at the same time, gave different versions. The interpreter, Mohammed Isa, said that the Kalmucks were not to be seen, as they fired from their houses. He took to his horse, and ran away to the next village (Kegudo), "to seek an interpreter there." When he returned in the evening, he found no traces of the caravan. The Kalmucks told him that when the Frenchman was left alone, they put him on a horse, carried him seven miles to the Yang-tse-Kiang, and threw him in, bound hand and foot, throwing stones at him until he sank. They divided his effects among themselves, throwing away all the books, manuscripts, and instruments. No less than 8 *yambs* (about 800 roubles), as well as diamond rings, were found in the possession of these two natives at Kashgar. They also had two excellent horses, so that Isa probably took part in the division of the spoil. The cook of the expedition also gave an account which corroborated the above. Tsa also says that M. de Rhins used to pay for provisions in Khotan gold, which very much dissatisfied the natives. Dr. Sven Hedin considers it his duty to throw, at least, some light on this tragical event, although these accounts are certainly not to be relied upon as true in every particular.

Pastukhoff's Ascent of Ararat.—The new volume of the *Zapiski* of the Caucasian Geographical Society is concluded by a paper by A. V. Pastukhoff on his ascent of Ararat, accompanied by two small maps of the summits of the Great Ararat (scale 1 : 25,200), and of the Little Ararat (1:2940). The ascent was begun on August 14, from the Sardar-bulagh encampment, and after having slept one night on a moraine, at an altitude of 13,000 feet, and another night below the summit, at a height of 16,000 feet, MM. Pastukhoff, Ivanovsky, Tamm, and Butyrkin, with five cossacks, reached the eastern summit, having only experienced difficulties in climbing over one rocky ledge, but not without having suffered, some of them, from rarefied air and lassitude. Three pigeons were despatched from the summit (two of them had, however, no desire of leaving the place). The minimum thermometer which had been left in 1888 by M. Markoff on the summit, was easily found, but, the spirit-column having been broken, the conclusions which had been drawn from its indications by previous climbers are of no value whatever. A stone pillar was erected by the party, and good maximum and minimum thermometers were left within it. The whole paper is full of valuable details.

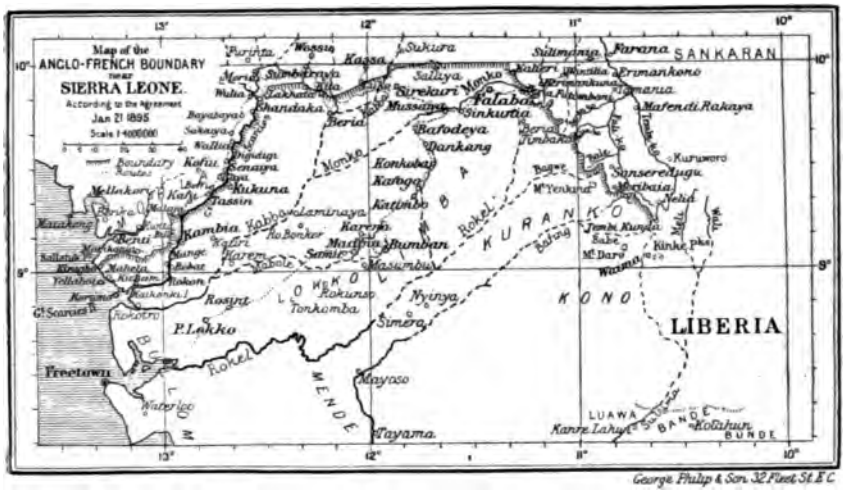
Navigation on the Vilui.—Travelling in Siberia gradually becomes more and more easy. Last summer a steamer, towing a barge, reached the Viluisk, and it took it only four days and a half to cover the whole distance of 670 miles from Yakutsk to Viluisk. The return journey down the river was accomplished in four days. In fact, as had already been proved a few years ago, steamers can ply up the great tributary of the Lena as far as Nyurba and Suntar.

A New Geographical Society.—We are glad to learn that the Amur Geographical Society, a branch of the Russian Geographical Society recently founded at Khabarovsk, on the Amur, has formed a branch named the Transbaikalian Filiation of the Amur Geographical Society, which will have its seat at Chita, in Transbaikalia. The young society, which has the governor of the province, Major-General Matzievsky, for its president, already possesses a museum, formed from the two museums of Nerchinsk and Troitzkosavsk, and containing over 10,000 various exhibits, and a library containing 1207 works. It has already published two pamphlets, one of which is a very valuable review of the climate of West Transbaikalia, as it appears from observations made at seven meteorological stations, founded and maintained by volunteers.

AFRICA.

Means of Transport in East Africa.—Before his untimely death at the hands of a raiding-party on Mount Kilimanjaro, Dr. Lent, who had already accomplished much scientific work in that region, had sent home a valuable paper on the question of transport in the German sphere, which has been published in the *Deutsches Kolonialblatt* (1894, Nos. 22 and 23). Although referring in particular to the special requirements of the region in question, there is so much in the essay that is of general application, that it cannot fail to be of use to all who are interested in the improvement of African communications. It is to be noted that, Dr. Lent's object being the supply of the immediate needs of the country in the most practical way, he does not touch upon the question of railway construction, nor has he in view the requirements of exploring expeditions, so much as the supply of a regular transport service as an aid to the economic development of German East Africa. The subject is dealt with under the two main heads of transport by carts and pack-animals. The feasibility of the former (which is, of course, to be preferred where practicable) depends principally on the chances of success in the rearing of a suitable breed of oxen, as to which some doubt might arise from the fact of the cattle plague which has so recently raged in the country. There is good reason, however, to believe that this has now completely died out, and, with the checking of the Masai raids, the danger of its recurrence will be minimized. Other conditions, of climate and food-supply, are not unfavourable, and certain localities (*e.g.* the low ground of the Luengera, which joins the Pangani at Korogwe) offer special advantages for breeding purposes. The zebu of India would seem to be the species likely to prove most serviceable. As regards the construction of roads, where moderate distances with a considerable traffic are in question, a fairly large outlay would probably be repaid, and, in view of the difficulty in the construction of a railway between Korogwe and Buiko, a good road (following, however, a different line from the present) is especially needed here. Dr. Lent differs from other writers in favouring the employment of *four-wheeled* carts, though not of the heavy South-African pattern, but rather that of the American farm-carts, which have of late years been exported to South America and Australia. He also deprecates the employment of oxen in pairs, which, he says, hampers the freedom of their movements. On both these points, however, the general practice in India, where the requirements would seem to be very similar, is opposed to his recommendations. Beasts of burden are of special value in that they can dispense with good roads. Dr. Lent discusses separately the advantages offered by each of the six kinds which come into question in East Africa. He does not take a sanguine view of the prospects of the advantageous employment of the elephant, though not on the score of any difficulty in taming the African species. He shows that the opinions which have been lately expressed in Germany as to the value of this animal for transport purposes are much exaggerated, while its power of thriving in damp forest regions, so detrimental to other beasts of burden, is no advantage in East Africa, the predominating steppes of which are rather likely to prove adverse. The expense, as well as difficulty, of providing suitable food, is a point in its disfavour, though for stationary employment in suitable localities it might be useful. The case is very different with the camel. Its successful introduction into Tuscany and North America shows that it is capable of acclimatization, provided that its primary requirements—a dry climate and level ground—are complied with. Such conditions are admirably fulfilled in many parts of East Africa when once the moist coast region is left behind, while the ease with which it finds suitable nourishment gives it a great advantage. The special use of the ox is for draught, and its employment as a beast of burden can only be recommended in the absence of roads. The tropics are not a home for the horse, and even for riding purposes certain breeds of donkeys, or mules, are preferable. The chief objection to the former is their slow pace; but the fact that a good breed (the Wanyamwezi or Masai donkey) already exists in the country, increases its importance. They have already been used with success for transport purposes, and are, at any rate, preferable to native porters. The mule, however, possesses advantages which would make its introduction seem particularly desirable. Its extensive employment in countries which suit it in point of climate—and although, like the camel, it prefers one warm and dry, it is capable of acclimatization to a very high degree—shows its value for purposes of transport, due principally to its strength, patience, and sureness of foot, which last especially fits it for mountainous districts. There can be no doubt that it would thrive in East Africa, while its greater ability to stand variations of climate gives it a higher place than the camel even. Dr. Lent considers that by some such measures as he suggests, the development of the German possessions may be furthered with a comparatively small outlay.

The Sierra Leone Boundary, 1895.—The boundary of Sierra Leone has at length been settled by an Agreement signed at Paris on January 21, 1895. Great Britain might have succeeded at one time in extending her colony of Sierra Leone until it joined that of the Gold Coast. Even the Agreement of August 10, 1889, did not shut her out from the back country, for, whilst assigning Tamisso to France, and the whole of Talla and Sulimania to Great Britain, the boundary terminated at the intersection of the 10th parallel with the 13th meridian to the west of Paris (10° 40′ west of Greenwich), which was at that time believed to lie to the west of the Upper Niger or Tembi-Ko. By an Agreement signed in June, 1891, Great Britain renounced all claims to that river, for it was arranged that the boundary should run along the 10th parallel to within 10 kilometers of the Niger, and then to take a southerly direction to its terminal point of Tembi Kunda. Commissioners were appointed to delimitate the boundary agreed upon on the spot, but differences arose, and they separated without having arrived at any settlement. Negotiations were continued at home, whilst in the field the French sought to fortify their claims by actually occupying the country in dispute. Captain Briquelet, in 1893, after having inflicted a serious defeat upon Bilali, one of Samori's lieutenants, established three posts on the upper Niger, namely Farana, Erimankono, and Mafendi Kabaya, and on his march to the coast he left a small garrison at Wossu. In the same year another post was founded by Captain Dargelos at Mara, in Kissidugu, on the Niadian, a tributary of the Niger. Negotiations were opened at the same time with Liberia, and on August 10, 1894, an Agreement was signed which recognizes the upper Cavally, the whole of the basin of the Niger, and everything lying to the north of the parallel of Tembi Kunda as being within the French sphere, whilst fixing upon the meridian of 13° west of Paris as the western limit of Liberia.* In the face of these established facts, the British commissioners charged with the negotiation of a definite agreement, laboured under considerable disadvantages, and



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* By an Anglo-Liberian Agreement of November 11, 1887, the boundary of Sierra Leone is formed by the river Manna, and by a line extending from its source in a north-easterly direction.

they were consequently constrained to make large concessions to French claims. Portions of Talla and Kukunia, and nearly the whole of Sulimania were surrendered to the French; the boundary is to follow the watershed of the Niger, which recedes as much as 32 miles from the river, instead of 6 miles as originally agreed upon; and the Franco-Liberian arrangement is to be looked upon as binding. On the other hand, certain very desirable arrangements for facilitating intercourse with the countries lying at the back of Sierra Leone were agreed upon. Frontier customs posts are to be established along the principal caravan routes, and the duties demanded are not to exceed those levied at the coast, nor 7 per cent. *ad val.* in the case of exports. Our sketch-map is reduced from that attached to the Agreement, and lithographed at the Intelligence Division of the War Office. The new work which it embodies is mainly based upon surveys made by Captain Kenney, by whom the positions of thirteen places were fixed by astronomical observations.

Herr O. Neumann's Journey in East Africa.—This German zoologist (*vide ante*, p. 79) had returned in December last to Taveta, near Mount Kilimanjaro, and some additional details respecting his journey are to be found in the *Deutsches Kolonialblatt* (1895, p. 74). His routes north of the Victoria Nyanza led him to Bulamwezi, a northern province of Uganda; while east of the Nile, three days from Wakoli, or Mtanda's, in an attempt to reach Mount Elgon, he came upon a broad and deep stream, which prevented further progress, as the cattle could not be transported across it. This was evidently the upper Mporogomo, which drains the *southern* slopes of the Elgon and flows to the Nile. The Wakenje live on it, in villages built on piles. On the return to Taveta, the usual route was followed over the Mau plateau (where the traveller suffered much from the cold), and past Lakes Nakuro and Naivasha to Machako's. Much difficulty was experienced from swollen streams. The additions made by the traveller to our knowledge of the zoology of East Africa are said to be remarkable.

The Country East of the Victoria Nyanza.—Owing to the death of Dr. G. A. Fischer shortly after his return from his expedition of 1885–86 for the relief of Dr. Junker, the complete geographical results of the journey were not at the time published, a preliminary sketch-map only being given in *Petermann's Mitteilungen* for 1886. The same journal now issues a map on the large scale of 1 : 750,000, embracing the country to the east and north-east of the Victoria Nyanza as far as 37° 40′ E. long., in which the results of the traveller's surveys are laid down, accompanied by extracts from his journals (1895, Nos. 1 and 2). For a considerable portion of the country to the east of the lake, Dr. Fischer is still our only authority (pending the publication of the results of Herr Neumann's journey), and as the map embodies also the surveys of other travellers within the region, its publication cannot fail to be useful. It is compiled by Dr. Bruno Hassenstein.

The Country North of Timbuktu.—Some details respecting the country north and north-east of Timbuktu, derived from information collected by the French military staff (*Comptes Rendus, Paris Geog. Soc.*, 1895, p. 62), add a little to our knowledge of the vast unexplored region east of Lenz's route. On the direct route to Arauan, followed by that traveller, the country is entirely devoid of water, the only variety being imparted by sand-dunes covered with stunted mimosas. A little to the east, however, there are wells at In Alahi and Bu Jebiha, the last a clay-built town like Timbuktu, and this route is therefore to be preferred. Mabruk, to the north-east, can be reached by a slightly circuitous route, abundantly provided with water throughout, and the region traversed is known as *Hessiane*, or "the wells." Although no European has yet made use of this route, the information is considered reliable, as it was obtained direct from nomads who are constantly traversing the district.

M. Foureau's Journey in the Sahara.—Undeterred by the difficulties encountered on his former journeys (cf. *Journal*, vol. iv. p. 65), this adventurous traveller has this winter renewed his attempt to penetrate southwards through the country of the Azjer Tuareg (*Comptes Rendus, Paris Geog. Soc.*, 1895, p. 45). The furthest point reached (about 27° 30′ S.) was apparently hardly an advance on that of last year, but a considerable extent of new ground was traversed *en route*, and the astronomical and magnetic observations and geological researches are likely to yield good results. The traveller has also brought back numerous photographs.

The Congo Railway.—The *Mouvement Géographique* reproduces (November 5, 1895) a letter written by Père de Hert, a missionary on the Congo, describing a journey on the completed section of the Congo railway, and giving an idea of the further progress made up to July of last year. He speaks with admiration of the difficulties which have been overcome in its construction, and the engineering necessitated by the nature of the country and the effects of the heavy rains of the hot season. At the time of writing trains were running regularly every two days between Matadi and Kenge, the time occupied being from 3 to 3½ hours. The figures given for the month of July, 1894, for this section are: 240 passengers, 139 tons of merchandise, and 15,941 francs receipts. A large-scale map of the line of the railway as far as Kimpesse, and reproductions of photographs showing points of interest on its route, accompany the article.

Sand-dunes and Winds on the South-West African Coast.—A note by H. C. Wilmer, clearly explaining the relation which exists between the sand-dunes on the coast of South-West Africa and the local wind-currents, was read before the South African Philosophical Society so far back as 1889, but has only lately been printed in the *Transactions* of the Society (vol. v. part ii.). Having shown how the strip of desert along the coast, due to absence of rain, itself promotes the conditions which led to its formation by generating during the summer months a south-west wind, which drives back the rain-clouds banked up further to the east, the writer explains the formation of the dunes by the rush of air during the winter months from the colder regions of the interior, to fill the vacuum caused by the rise of heated air from the surface of the desert. This east wind carries with it enormous quantities of sand resulting from the disintegration of the desert surface, which it deposits on the coast in the form of dunes or sandbanks, when it meets the current of colder, denser air from the sea. Under the combined action of the south-westerly and easterly winds, the dunes gradually advance towards the north. They never, however, pass the mouth of the Swakop river, as has been lately remarked by Dr. Dove, as the annual rush of water carries out the accumulating sand into the sea. The Khuisib does not every year send down sufficient water to clear out its bed, and in consequence has, in course of time, shifted its mouth from Sandwich harbour to Walfish bay, a distance of 30 miles, as evinced by the old silt bed, with roots and stems of reeds and footprints of elephants and rhinoceros, which is seen beneath and between the dunes.

AMERICA.

The Geological Antillia.—The position and arrangement of island groups in the seas near continental shores have frequently suggested a resemblance to partially submerged mountain chains. In no case is this resemblance more striking than in the bold seaward curve of the West Indies, running in a row of peaks from North to South America. A recent number of the *Geological Magazine* (No. 364, October, 1894) contains an abstract of a paper read by Dr. J. W. Spencer to the American Geological Society, on the restoration of the Antillean continent. He founded his argument, not on the mountain peaks, but on the submerged valleys which have been revealed by the careful soundings of the United States surveying-ships in the Gulf of Mexico and Caribbean Sea. The submarine valleys have been grouped into systems, which in all cases connect with the existing land-valleys of the continent. These, in Dr. Spencer's opinion, are the lower ends of river-cañons which cross the coastal slopes and terminate in the bays of the continental mass. These hollows must have originally been as high above sea-level as they now are deep below it, if the author's theory of their origin is to be accepted; and he proceeds to trace out the steps of the subsidence which have carried them down to form the bottom of the Caribbean Sea. The drainage of the ancient Antillean continent must have been, on this theory, almost entirely to the west, there being only two or three long valleys on the eastward side of the Windward mass. The physical changes correspond to and explain the distribution of most of the marine fauna of the locality; but the Sea of Honduras appears to be somewhat intractable, forming an exception to the general theory.

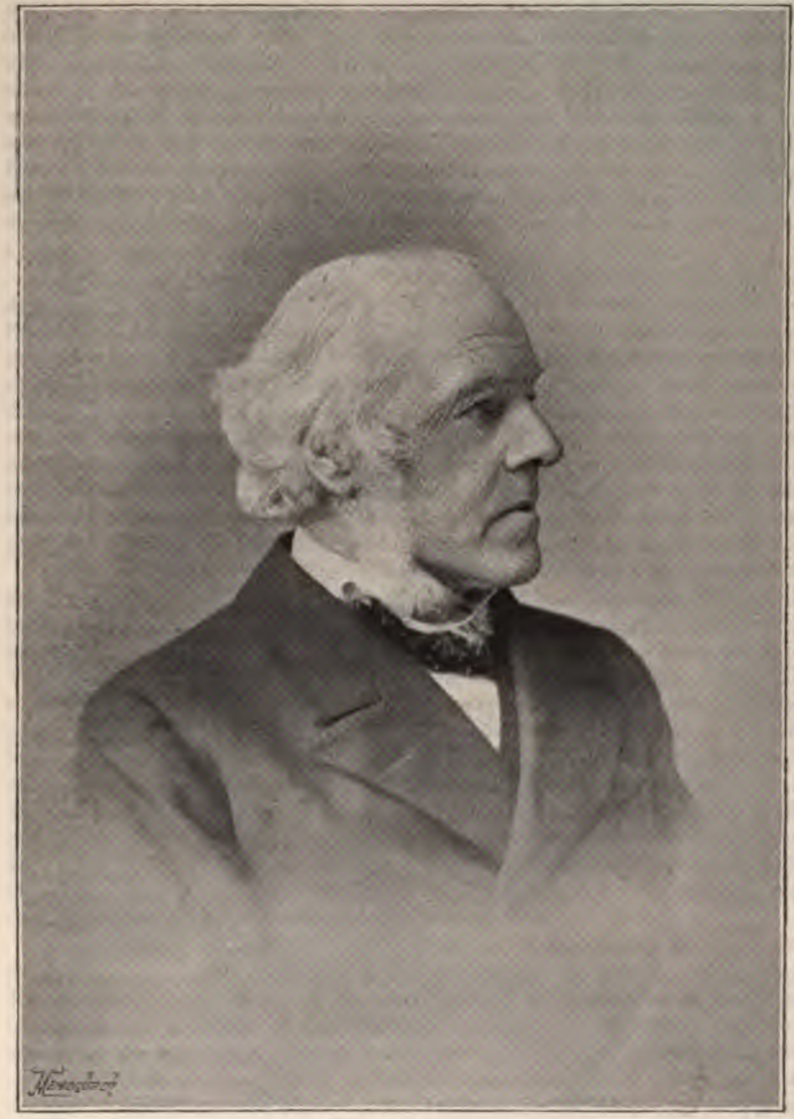
OBITUARY.

Lord Aberdare.

By Sir George Taubman Goldie, K.C.M.G.

Henry Austin Bruce was born in 1815, at the commencement of the long peace; and, although the latter half of his life witnessed repeated outbreaks of the international jealousies of Europe, he remained to the end unshaken in the hopes prevalent during his earlier manhood. If fears were expressed before him that France would force a war upon this country, he would say that he had heard that prophecy for seventy years, and if he were spared till it were verified, he believed he might attain double that age. Yet he approved of preserving peace by preparing for war. His strong affection for France dated from his boyhood, when he resided there for six years. It was the period when the Napoleonic legend was at its height; and, encyclopædic as was Lord Aberdare's literary knowledge, I doubt whether, to the last, any publications yielded him more interest than those which threw fresh light on the life of Bonaparte. Biography was, indeed, the favourite mental recreation of his later years.

Mr. Bruce's career in Parliament and the Cabinet is rather a matter for history than for this brief notice. But the loss of his seat for Merthyr, which he had represented from 1852 to 1868, deserves remark. It was mainly due to his uncompromising opposition to the principle of the ballot. His frank and courageous nature was averse from concealment of any kind; and, in common with many of the highest minds of that time, he feared lest a spirit of deception might be encouraged amongst the electors. In the days of restricted suffrage, the use of a vote was generally regarded more as a trust for the community and less as an individual right, than at present. It is characteristic of the rare openness of mind which distinguished Lord Aberdare throughout his life that, at a later date, he became convinced of the necessity—as a protection from popular violence—of the very measure which had cost him his seat. From 1862 to 1868 he had filled in turn the posts of Under-Secretary of State at the Home Office, and Vice-President of the Council. Soon after his defeat at Merthyr he was returned for Renfrewshire, and became Home Secretary until 1873, when he was raised to the peerage, and exchanged his office for that of President of the Council, which he held till the close of his political career in 1874. His only serious mishap, during his long



RIGHT HONOURABLE LORD ABERDARE.
(From a Photograph by Mayall & Co.)

tenure of the unthankful office of Home Secretary, was the failure to pass his Licensing Bill, which not a few political opponents have since regretted. Seventeen years later, an elaborate and remarkable tribute to the merits of that measure was paid by the late Lord Randolph Churchill in the House of Commons, on April 29, 1890, and was received with general cheers. I can only quote the following short passage: "The right hon. gentleman, the present Lord Aberdare, when he was Home Secretary as Mr. Bruce, introduced a Bill for the comprehensive reform of the licensing laws, which, I greatly regret to say, led to no result. It was produced by him in a speech of great power, and, curiously enough, it was received by the House with great approval. I am not old enough to recollect, and I have not been able to ascertain, the precise causes which led to the precipitate abandonment of that Bill. But it was abandoned owing to the party feeling of the time, and considerable unpopularity accrued to the Government, very unjustly I think, for having introduced the Bill."

Lord Aberdare became a Fellow of the Geographical Society in 1859. At the Anniversary Meeting of 1880, the jubilee year of the Society, he was elected President for the first time, and, with the exception of one year, continued to hold that office until 1887. Although he was then compelled to retire by the multiplicity of public claims on his energies, which advancing age made it every year more difficult for him to meet, his close connection with the Society, as a joint trustee with Sir John Lubbock, did not cease until his death, on February 25 last, a few weeks before completing his eightieth year. His successor in the President's chair, General Strachey, only expressed the general feeling of the Fellows when he said, in the annual address of 1887, that, with the exception of Sir Roderick Murchison, there was no one of the presidents to whom the Society had been so much indebted.

During his second year of office, Lord Aberdare consented to represent the Society, conjointly with the late Sir Henry Layard and Mr. John Ball, at the International Geographical Congress at Venice—a congenial duty, apart from the service to geography; as Sir Henry Layard, who had taken up his residence in Venice since 1880, was a close friend of more than forty years' standing. It will be remembered that Lord Aberdare's latest literary work was a delightful "Introductory Notice" to the new edition published last Christmas of Sir Henry Layard's 'Early Adventures in Persia, Susiana, and Babylonia.' Lord Aberdare's remarks on the International Congress, made at the opening meeting of the session of the Royal Geographical Society in November, 1881, are especially interesting at the present moment, when the hopes which he then expressed that the Congress would before long meet in London, are on the point of being realized. The weighty reasons he gave for this desire would suffer from abridgement, and I must therefore refer those interested to the *Proceedings* of the Society.

Lord Aberdare considered himself fortunate in having, during the whole term of his office, two active coadjutors as hon. secretaries—the present President and Mr. Freshfield. His tenure of the chair covered the interesting period of the incubation and outbreak of the European occupation of the Dark Continent, which, as the least-known quarter of the globe, has perhaps furnished the most extensive and interesting field for exploration during this century; while the international struggles involved in the "scramble for Africa" aroused a degree of public attention which purely scientific research does not always command. His first evening in the chair (November, 1880) was on the occasion of Mr. Joseph Thomson's paper on the Society's East African Expedition, and during the following seven years Africa was continually in the foreground. As a geographer, he always insisted that knowledge has no nationality, and he terminated his annual address of May, 1882, with some striking remarks on this point, concluding with the characteristic sentence, "Long may there be Rohlfs, Serpa Pintos, and Nachtigals to dispute the highest honours we can confer with the Gills, Leigh Smiths, and Kirks of our native land."

But outside the walls of the Society, he was not willing that his native land should be outstripped in the work of civilizing a new continent; and, on this ground, he accepted the chair of the Niger Company, which was expressly offered to him as the President of the Geographical Society. His interest in the Niger enterprise did not slacken with advancing years, but grew with his strengthening conviction of the field of usefulness that it opened up. The point of view from which he always regarded it was expressed in a letter written on November 3 last, in which, after speaking of "the truth of Burke's pathetic saying, 'What shadows we are, and what shadows we pursue!'" he added, "and yet not wholly so, if no small part of our pursuit is the good of millions of our fellow-creatures, as I know ours to be."

Lord Aberdare's life-long work in connection with questions of education, other than geographical, was too extensive for detailed notice here, but a brief reference must be made to the foundation of a university for Wales. To his excessive exertions in completing this work, of which he had been the moving spirit, and to his anxious labours as Chairman of the Royal Commission on the Aged Poor, may be attributed the sudden breakdown of his health. He was elected unanimously as the first chancellor of the new university, and his investiture was fixed for the present month. Probably no statesman of this century has taken a leading part in so many and diverse public movements for the advantage and elevation of the human race. Nor was his detestation of injustice and needless suffering displayed only within this limit; for he was, during fifteen years, President of the Society for the Prevention of Cruelty to Animals, and only advancing age compelled him, in 1893, to resign in favour of H.R.H. the Duke of York.

Great intellectual power and moral excellencies command respect, but do not necessarily invite affection. Lord Aberdare's sympathetic and genial nature was irresistible to those with whom he was in frequent contact. He knew not only how to elicit the confidence and affection of the humblest neighbours of his Welsh home, but how to bridge over the wider gulf between age and youth; for his own heart always remained young, and though this is not the place to touch on the subject of his family relations, I may, perhaps, say that he had in perfection *l'art d'être grand père*. With such a rare combination of gifts, it was only natural that his noble life should be crowned with—

> "That which should accompany old age,
> As honour, love, obedience, troops of friends."

CORRESPONDENCE.

The Supposed Discovery of Brazil by the Portuguese in 1447.

This subject interests me doubly, as an important question of geographical history, and a fascinating one of historical evidence. May I be allowed to say how it strikes me, on the materials as yet before us?

First, if, on his return from London, Bianco heard at Lisbon that an island which he had hypothetically inserted in his map to the west of Spain had been found to be authentic, it is very likely that he would make a note to that effect at the bottom of the map. So far I agree with the President. *But Bianco would not have accompanied his note by the drawing of an island.* He could not have been blind to the fact that, by so doing, he would tempt people to think that the island was where he had drawn it, or at least as near to that place as the want of more room in the map to the southward and westward permitted.

Secondly, Bianco's note appears to tell us that the island is 1500 miles further west than he has drawn it, which is a little to the west of south from Cape Verde, and not very far from that cape. But it must not be assumed that the note excludes his having believed it to be also further south than he had drawn it. If such was his belief, we should expect that, after "distant to the west 1500 miles," he would write, "and to the south so many miles." And it is very likely that he did so, in the line which the President suggests has probably been cut off. But if he did not, his note, though brought to an end by want of space, was, on Mr. Yule Oldham's view, correct as far as it went. On the other hand, if Bianco meant that the island was 1500 miles west of the Strait of Gibraltar, the note as it stands would be so obviously misleading that he could scarcely have failed to extend it over the map by adding two words, "from Gibraltar."

When Herrera's statement, that Columbus in 1498 knew of an affirmation by King John of Portugal that there was a continent to the southward, is added to the above considerations on Bianco's map, it appears to me that the balance of evidence is at present considerably in favour of a Portuguese discovery of Brazil between 1445 and 1448. Galvão's story, with its mention of the Strait of Gibraltar as the point of departure for the unwilling voyage, may or may not refer to the same event. I lay no stress on it.

J. WESTLAKE.

3, Chelsea Embankment, March 5, 1895.

Lake Mweru.

In the Monthly Record of the *Geographical Journal* for November, 1894, I see, under the heading, "A Visit to Mweru," some notes of a recent journey to that lake by Mr. Crawfurd. It is stated by this gentleman that the Luapula river has two mouths into Mweru, and the notes referred to remark that in my map only one is shown, "although earlier maps supposed two divided by Kisi island." The earlier map referred to is, I presume, my own sketch-map, which appeared with the account of my *first* journey to Mweru in 1890. No previous map, that I am aware of, supposed two mouths to the Luapula. The statement that the Luapula had possibly two mouths into Mweru was made by me in 1890, on the strength of native information. On my *second* journey, however, in 1892, I thoroughly explored the lower course of the Luapula, before its entrance into Mweru, and was compelled to show that my previous supposition was wrong. Needless to say, I should not have done this without very careful investigation.

The south shore of Mweru is merely a beach thrown up by the lake, backed by an enormous extent of marshes, through which the Luapula flows in one large clearly defined course. I can state without hesitation that this river has only one mouth into the lake, as I not only coasted along the south shore of the Mweru twice, and both ascended and descended the Luapula by boat, but also explored several large inlets from the lake into these marshes, and found each one to be a *cul-de-sac.* From some of them, however, it is possible to reach the river in native canoes, by pushing them through the marshes, but in a boat I found this to be impossible. Doubtless Mr. Crawfurd has been informed by natives that the inlet he speaks of communicated with the Luapula, and very probably it does so, but it is in no way a *mouth* of the river.

The same notes also mention "five islands" as lying east of the Luapula mouth. The beach I have referred to is broken in several places by inlets, and at its back it has marshes. To this extent, therefore, one might call these pieces of beach "islands." There is, however, only *one* true island (which can be circumnavigated) in Mweru—*Kilwa.*

The Kilwa chief spoken of as "Shimba," is Simba ("a lion"), one of Abdallah bin Suliman's lieutenants.

"Va Shila" is doubtless a mistake for *Wa-Chilwa* (the people of Chilwa or Kilwa). No people but those of Simba live at the south-west end of Mweru.

Possibly there may be some African language in which "Mweru" means "white," as stated by Mr. Crawfurd; but this is the universal word in Lunda, Itawa, and the adjacent countries, for "lake." It takes the place of the word "nyanja" used further east.

ALFRED SHARPE.

Zomba, British Central Africa, January 15, 1885.

MEETINGS OF THE ROYAL GEOGRAPHICAL SOCIETY, SESSION 1894–95.

Special Meeting, February 18, 1895.—CLEMENTS R. MARKHAM, ESQ., C.B., F.R.S., President, in the Chair.

The Paper read was:—

"Journey to the Pamirs and the Sources of the Oxus." By the Hon. G. N Curzon, M.P.

Afternoon Technical Meetings. Friday, February 22, 1895.—CLEMENTS R. MARKHAM, ESQ., C.B., F.R.S., President, in the Chair.

1. "A New Cosmosphere." By W. B. Blaikie.
2. "An Instrument for showing the apparent Diurnal Motions of Celestial Bodies." By R. A. Gregory, F.R.A.S.
3. "A Graphic Method for showing the Duration of Daylight." By Lieut. Carlyon Bellairs.

Seventh Ordinary Meeting, February 25, 1895.—CLEMENTS R. MARKHAM, ESQ., C.B., F.R.S., President, in the Chair.

ELECTIONS.—*Alexander Devine; Morgan Ignatius Finucane, M.R.C.S.; Captain H. D. Laffan, R.E.; Gordon W. Miller; Dr. John Murray; C. Guy Pym; Surgeon-Captain J. R. Roberts.*

The Paper read was:—

"British New Guinea." By Sir William Macgregor, K.C.M.G.

The PRESIDENT said: I am sure the Fellows of this Society will hear with very great regret the sad news I have received from Sir Henry Howorth of the death of our old President, Lord Aberdare. He was for five years President of this Society, and filled this chair always with geniality, always with kindness and great ability. For myself I can only say I have to regret a very old friend, for whom I have had a deep regard and esteem. I have to report that the subscriptions are coming in for the International Geographical Congress; that the Fishmongers Company have just sent a subscription of 100 guineas, and the Salters Company have also subscribed. I take this opportunity of announcing that on May 20 we shall have a special meeting to commemorate the fiftieth anniversary of the departure of Sir John Franklin's expedition, which will subsequently be commemorated on June 4 by the

Scottish Geographical Society, that being the day when Sir John left the Orkneys. I would also announce that on the day of the anniversary the Society will hold its *soirée*, which will take place in the Water-Colour Galleries, Piccadilly.

Eighth Ordinary Meeting, *March* 11, 1895.—CLEMENTS R. MARKHAM, ESQ., C.B., F.R.S., President, in the Chair.

ELECTIONS.—*Major C. McGuire Bate, R.E.; George William Capel; Vice-Admiral Philip Colomb; Captain Charles Crutchley (Leinster Regiment); Samuel Garman; Sir Henry Howorth, K.C.I.E., F.R.S., M.P.; John Grant Langlands; Captain Frederick Eyre Lawrence (Rifle Brigade); Willy Rickmer Rickmers; Arthur Ruddlesden; Samuel Wells; A. F. Willoughby.*

The Paper read was:—

"Three Years' Travelling and Fighting on the Upper Congo." By S. L. Hinde (Captain in the Belgian Service).

DEATH OF SIR HENRY RAWLINSON, LORD ABERDARE, AND SIR E. H. BUNBURY.

The PRESIDENT said: This evening I must open our proceedings by a reference to the heavy losses that the Society has just sustained.

In Sir Henry Rawlinson and Lord Aberdare our Society has lost two of the best of our Presidents.

Sir Henry received the gold medal fifty-five years ago for exploring Khuzistan, and he had been a Fellow for more than fifty years. While still working in the field of eastern research he sent home valuable papers to us on Khuzistan, on the site of the Atropatenian Ecbatana, and on the comparative geography of Afghanistan, for even in the midst of his anxiety as Resident at Kandahar, during the first Afghan war, he did not forget the interests of our Society.

He returned to England a ripe geographical scholar, renowned for his Assyrian researches, and as the discoverer of the Behistun Inscription, which may be considered almost as much a geographical as a historical inscription. Sir Henry came on our Council in 1850, and continued on it almost without intermission until 1893. During the long period that Sir Roderick Murchison was President, we received several papers from Sir Henry Rawlinson on subjects connected with Persia and Central Asia. He was a constant attendant at our meetings, and a very active member of our Council. He frequently joined in discussions on the subjects with which he was best acquainted, and sometimes he enchained the attention of his audience by pouring out fresh geographical illustrations from the depths of his great learning, clothed in all the charms of a clear voice and a good delivery.

I remember that during Sir Roderick Murchison's long illness he several times said to me that Sir Henry Rawlinson should take his place, and that he considered him to be the most suitable man for his successor, and I assured him of my conviction that all the Fellows of the Society were unanimously of the same opinion.

As our President, Sir Henry Rawlinson did honour to this chair by his great knowledge of eastern geography, and his unequalled acquaintance with the historical geography of Persia and Central Asia. He presided with great ability and never-failing tact; while his charming receptions and the hospitalities of Sir Henry and Lady Rawlinson in Charles Street will never be forgotten by those who enjoyed them.

Of late years advancing age has obliged him to absent himself from his accustomed place in this hall. He has been much missed, and more than once I have publicly expressed my regret at his enforced absence. The very last time I saw him, however, he told me that he hoped to be able to be with us when the weather was warmer. This can never be now. He passed away full of years and of well-deserved honours, and regretted by none more than by his old geographical friends.

The death of Lord Aberdare has also been a source of deep regret among Fellows of the Society. He was an admirable President, taking a deep interest in the work, and always courteous, genial, and warm-hearted. We have to thank my old friend and master, Lord Northbrook, for having suggested Lord Aberdare to preside over us, and for having persuaded him to accept the nomination. For Lord Aberdare felt diffidence respecting his fitness, although, as all well know, he certainly had no cause for any such feeling. I cannot resist reading an extract of a private letter from Lord Aberdare, in which he says, "My connection with the Society has been to me one of unmixed pleasure, and everything has been done, by no one more than yourself, to make it so. But one and all have done their best to enable me to perform the duties of the office as well as one not a master of geography could hope to do."

It is a great pleasure now to be able to reflect that Lord Aberdare retired with this kindly feeling towards us all. He certainly left behind him a very warm feeling of gratitude for his good services, and of affection for himself.

We also have to regret the loss of Sir Edward Bunbury. He was not often to be seen amongst us of late years; but he was well known to us, and appreciated as the author of one of the most valuable geographical works that has appeared in this country during the century.

Technical Meeting, March 15, 1895.—CLEMENTS R. MARKHAM, ESQ., C.B., F.R.S., President, in the Chair.

The Paper read was :—

"The Palæontological Evidence as to the Age of the Atlantic." By Dr. J. W. Gregory.

GEOGRAPHICAL LITERATURE OF THE MONTH.

Additions to the Library.

By HUGH ROBERT MILL, D.Sc., *Librarian*, R.G.S.

THE following abbreviations of nouns and the adjectives derived from them are employed to indicate the source of articles from other publications. Geographical names are in each case written in full :—

A. = Academy, Academie, Akademie.
Ann. = Annals, Annales, Annalen.
B. = Bulletin, Bollettino, Boletim.
Com. = Commerce, Commercial.
C. R. = Comptes Rendus.
Erdk. = Erdkunde.
G. = Geography, Geographie, Geografia.
Ges. = Gesellschaft.
I. = Institute, Institution.
J. = Journal.
M. = Mitteilungen.
Mag. = Magazine.
P. = Proceedings.
R. = Royal.
Rev. = Review, Revue, Revista.
S. = Society, Société, Selskab.
Sitzb. = Sitzungsbericht.
T. = Transactions.
V. = Verein.
Verh. = Verhandlungen.
W. = Wissenschaft, and compounds.
Z. = Zeitschrift.

On account of the ambiguity of the words *octavo*, *quarto*, etc., the size of books in the list below is denoted by the length and breadth of the cover in inches to the nearest half-inch. The size of the *Journal* is 10 × 6½.

EUROPE.

Austria—Dalmatia. *Abrégé B.S. Hongroise G.* **23** (1894): 16–20. **Czink.**
Arbe. Isola dalmata nel Quarnero. [By Prof. L. Czink.]

Bay of Biscay—Currents. *B.S.G. Commerc. Bordeaux* 18 (1895): 45–52. **Lagrandval.**
Courants, vents et orages dans la baie de Saint-Jean-de-Luz. Par S. de Lagrandval.

A continuation of the work carried on on the Bay of Biscay by M. Hautreux.

Bruckmann's Guides. ———
Bruckmann's Illustrated Guides. Munich: A. Bruckmann. London: Asher & Co. Size 7½ × 5. *Maps and Illustrations.*

Nos. 2–5. Venice. By Dr. Gsell Fels. Translated by J. Albert Swallow. 1895. Pp. xiv. and 132. *Price* 2*s*.

Nos. 7–7a. Como and the Lake of Como. By Fr. Girard. Pp. 64. *Price* 9*d.*

No. 12. Trento and the neighbouring district. By Prof. Dr. Karl Jülg. Pp. 64. *Price* 6*d.*

No. 17. Varese and its neighbouring district. By Josef Fischer. Pp. 32. *Price* 6*d.*

No. 20. San Remo and the neighbouring district. By François Girard. Pp. 38. *Price* 6*d.*

Nos. 26–27. Nuremberg. Nuremberg: J. P. Raw'sche Book-Shop. Pp. viii. and 62. *Price* 1*s*.

No. 49. Pisa. By Professor Jens Weile. Pp. 56. *Price* 6*d.*
Presented by Messrs. Asher & Co.

These guides are well executed, and should prove attractive to tourists.

Corsica. *Alpine J.* 17 (1895): 328–331. **Freshfield.**
Corsica Revisited. A Note by Douglas W. Freshfield.

Corsica. **Richardson.**
Corsica, Notes on a recent visit. With a Map of the Forests and Mines of Corsica. By Ralph Richardson. [Reprinted from the *Scottish Geographical Magazine* for October, 1894.] Size 10 × 6½, pp. [36]. *Presented by the Author.*

Mr. Richardson has supplemented the paper as printed by a set of translations of Corsican ballads and a number of photographs of the parts of Corsica he visited.

France—The Vosges. **Fraipont.**
Les Montagnes de France. Les Vosges. Par G. Fraipont. Paris: H. Laurens [not dated; 1895?]. Size 11½ × 8, pp. xii. and 426. *Illustrations. Price* 7*s*. 6*d*.

A charming description of the department of the Vosges, forming a picturesque essay in regional geography.

Greece—Locris. *Z. Ges. Erdk. Berlin* 29 (1894): 409–474. **Skuphos.**
Die zwei grossen Erdbeben in Lokris am 8–20, und 15–27, April, 1894. Von Dr. Theodor G. Skuphos. *With Map and Plates.*

MATHEMATICAL AND PHYSICAL GEOGRAPHY.

Astronomy. **Larkin.**
Elliptical Orbits: their distinctive mechanical characteristics and their possible origin. By Henry Larkin. London: T. Fisher Unwin, 1895. Size 8½ × 5½, pp. 16. *Illustrations. Price* 1*s*. *Presented by the Author.*

Chronometers. **Gautier.**
Le Service Chronométrique à l'Observatoire de Genève et les concours de réglage de la Classe d'Industrie et de Commerce de la Société des Arts de Genève, avec une étude des épreuves instituées dans d'autres observatoires pour les chronomètres de poche. Par Raoul Gautier. Genève: Imp. Aubert-Schuchardt, 1894. Size 9½ × 6½, pp. xii. and 172. *Presented by the Author.*

Climate and Biological Distribution. *National G. Mag.* 6 (1894): 229–238. **Merriam.**
Laws of Temperature-Control of the Geographic Distribution of Terrestrial Animals and Plants. Annual Address by Vice-president Dr. C. Hart Merriam. *With Maps.*

This will be noticed in the Monthly Record.

Geodesy. **Helmert.**
Bemerkungen zu der Schrift: "Die Erforschung der Intensität der Schwere im Zusammenhange mit der Tektonik der Erdrinde als

Gegenstand gemeinsamer Arbeit der Kulturvölker, von Helmert (Kgl. Ges. d. Wissenschaften zu Göttingen, Juni 1894)." Size 7½ × 4½, pp. 8. *Presented by the Author.*

Geological Experiments. **Reyer.**

Geologische und geographische Experimente. Ausgeführt mit Unterstützung der kaiserlichen Akademie der Wissenschaften von Ed. Reyer. III. Heft.: Rupturen. IV. Heft.: Methoden und Apparate. Leipzig: W. Engelmann, 1894. Size 9 × 6, pp. 32. *Plates. Presented by the Author.*

Professor Reyer here studies the rupture of strata breaking under stress and gives an account of his experiments, with numerous illustrations of the results. He points out that accurate geodetic measurements may detect the changes of surface actually in progress which result from the yielding of strata through accumulating stresses.

Indian Ocean. **Meinardus.**

Beiträge zur Kenntniss der klimatischen Verhältnisse des nordöstlichen Theils des Indischen Ozeans. Inaugural-Dissertation zur Erlangung der Doktorwürde von der Philosophischen Fakultät der Friedrich Wilhelms-Universität in Berlin . . . von Wilhelm Meinardus. Altona, Hammerich & Lesser, 1894. Size 11½ × 9, pp. 48 and xx. *Presented by the Author.*

This thesis is a discussion of a large number of observations collected by German ships in the north-eastern part of the Indian Ocean, but Dr. Meinardus has also consulted other authorities. He has compiled a series of tables showing the relative frequency of wind from sixteen points of the compass, and its average force for each month, as well as numerous other meteorological generalizations.

Land Forms. **Löwl.**

Einige Bemerkungen zu Penck's Morphologie der Erdoberfläche. Von Prof. Dr. Ferdinand Löwl. (Separat-Abdruck aus den Verhandlungen der k. k. geolog. Reichsanstalt, 1894, Nr. 17 u. 18. Wien, 1894. Size 10½ × 7½, pp. [20]. *Presented by the Author.*

A stringent criticism of Penck's work on the morphology of the Earth's surface, especially of the sections dealing with tectonic problems.

Latitude Changes. **Preston.**

On the variation of latitude at Waikiki, near Honolulu, Hawaiian Islands, as determined from observations made in 1891 and 1892 in co-operation with the International Geodetic Association. A report by E. D. Preston. [From the U.S. Coast and Geodetic Survey Report for 1892. Part ii., pp. 53–159.] *With Diagrams.*

Latitude Changes. *B.A. Imp. Sci. St. Petersburg* 35 (1894): 245–256. **Ivanof.**

Sur les lois des variations des latitudes terrestres d'après les observations faites au grand cercle vertical de Poulkovo. Par A. Ivanof.

Latitude Changes. *B.A. Imp. Sci. St. Petersburg* 35 (1894): 545–557. **Nyrén.**

Variations de la latitude de Poulkovo observées au grand cercle verticale dans les années 1882–91. Par M. Nyrén. (Avec deux planches.)

Latitude Changes. *B. A. Imp. Sci. St. Petersburg* 35 (1894): 559–583. **Kostinsky.**

Sur les variations de la latitude de Poulkovo, observées au grand instrument des passages, établi dans le premier vertical. Par S. Kostinsky. (Avec une planche).

The last of these papers deals with observations made since 1890.

Latitude Changes. ———

On the variation of latitude at Rockville, Md., as determined from observations made in 1891 and 1892 in co-operation with the International Geodetic Association. [From the U.S. Coast and Geodetic Survey Report for 1892. Part ii., pp. 1–51.] *With Diagrams.*

Latitude Determinations. **Fowler.**

Determination of latitude by observations in the Prime Vertical. By Thomas Walker Fowler, Past President Victorian Institute of Surveyors. Read before the Institute September 28, 1894. Size 8½ × 5½, pp. 8. *Plate. Presented by the Author.*

Latitude Determinations. **Guarducci.**

Sui progressi fatti dalla Astronomia geografica nella determinazione delle latitudini e nelle misure di archi terrestri. Relazione del Dott. Federico Guarducci. Atti del Primo Congresso Geografico Italiano tenuto in Genova, 1892. Vol. ii. part i. Genoa, 1894. Pp. 37–43.

Limnology. *Globus* 67 (1895): 80–84. **Sieger.**

Die Fortschritte der Seenforschung. Von Dr. Robert Sieger. Wien.

A summary of recent limnological work.

Meteorology—Temperature. **Buchanan.**

On Rapid Variations of Atmospheric Temperature, especially during *Föhn*, and the Methods of observing them. By J. Y. Buchanan, F.R.S. [From the *Proceedings of the Royal Society*, vol. 56.] [1894.] Size 8½ × 5½, pp. [20]. *Presented by the Author.*

Meteorology—Temperature. **Mill.**

Temperature of Soil, Water, and Air. By Hugh Robert Mill, D.SC. Second of a series of six lectures on Meteorology in relation to Hygiene, delivered April 26, 1894. [Excerpt from Part II. of the *Journal of The Sanitary Institute*, vol. xv.] Size 8½ × 5½, pp. [18]. *Presented by the Author.*

Mountains. **Conway.**

Mountain Falls. By W. M. Conway. From the *Contemporary Review*, December, 1894. Size 10½ × 6½, pp. [8].

Nautical Almanac. ——

The American Ephemeris and Nautical Almanac for the year 1897. Washington: Bureau of Equipment, 1894. Size 10½ × 7½, pp. viii. and 534. *Chart.*

Nautical Almanac. ——

The Nautical Almanac and Astronomical Ephemeris for the year 1898, for the Meridian of the Royal Observatory at Greenwich. Also part i. (containing such portions as are essential for Navigation). London: Eyre and Spottiswoode, [1894]. Size 9 × 6, pp. xii., 624, and 17; (part i.) xii. and 306. *Presented by the Lords Commissioners of the Admiralty.*

Oceanography. **D'Albertis.**

Come la navigazione da diporto possa validamente contribuire allo studio della Geografia fisica dei mari e dei laghi. Relazione del Cap. E. A. D'Albertis. Atti del Primo Congresso Geografico Italiano tenuto in Genova, 1892. Vol. ii. part i. Genoa, 1894. Size 10 × 7, pp. 72–92.

Oceanography. **Dickson.**

Report on physical investigations carried out on board H.M.S. *Jackal*, 1893–94. By H. N. Dickson. (From the Annual Report of the Fishery Board for Scotland, 1894.) Size 10 × 6, pp. [48]. *Maps. Presented by the Author.*

This will be noticed elsewhere.

Oceanography. **Dohrn.**

Dei mezzi per promuovere le esplorazioni talassografiche e specialmente della cooperazione che i proprietarî di bastimenti da diporto, le società di canottieri, ecc., potrebbero dare allo studio della Geografia fisica del mare e dei laghi. Relazione del Prof. A. Dohrn. Atti del Primo Congresso Geografico Italiano tenuto in Genova, 1892. Vol. ii. part i. Genoa, 1894. Pp. 93–97.

Oceanography. **Sieger.**

Eine hydrographische Studie Swedenborg's. Von Dr. Robert Sieger, Wien. (Sonderabdruck aus Nachrichten über Geophysik, Bd. i.) Size 9 × 6, pp. 12. *Presented by the Author.*

Oceanography. **Monaco.**

Sur les premières campagnes scientifiques de la "Princesse-Alice." Note du Prince Albert 1er de Monaco. (Extrait des Comptes Rendus de l'Académie des Sciences, vol. 120, Janvier, 1895, pp. 20–24.) Size 11 × 9, pp. 6. *Presented by the Author.*

Oceanography. **Buchanan.**

Sur la densité et l'alcalinité des eaux de l'Atlantique et de la Méditerranée. Par M. J.-Y. Buchanan. (Extrait des Comptes Rendus de l'Académie des Sciences.) Paris: Gauthier-Villars et fils [1893]. Size 11 × 9, pp. 4.

Oceanography—Currents. **Mathiesen.**

Les Courants de la Mer et leur origine. Par le Général Mathiesen. (Extrait de la Revue maritime et coloniale Octobre, 1894.) Paris: L. Baudoin, 1895. Size 10 × 6½, pp. 27. *Presented by the Author.*

Oceanography—Dardanelles. **Magnaghi.**

Di alcune esperienze eseguite negli Stretti dei Dardanelli e del Bosforo per misurarvi le correnti a varie profondità. Comunicazione del Contrammiraglio G. B. Magnaghi. Atti del Primo Congresso Geografico Italiano tenuto in Genova, 1892. Vol. ii. part i. Genoa, 1894. Pp. 440–453. *With Plates.*

Oceanography—Deposits. *C.R.* **119** (1894): 968–970. **Thoulet.**

Les vases marines et leur classification. Par M. J. Thoulet.

The basis of classification proposed is the proportion of clay to sand in the deposits.

Oceanography—Mediterranean. ———

Berichte der Commission für Erforschung des östlichen Mittelmeeres. Dritte Reihe. (Aus den Denkschriften der Kais. Akademie der Wissenschaften in Wien, Bd. lxi.) [Not dated; 1894.] Size 12 × 9½, pp. 116. *Maps and Plates. Presented by the Academy.*

Besides some zoological papers, this volume contains Dr. Natterer's report on the chemistry of the *Pola's* expedition in 1893, and a report on physical observations by Professors Luksch and Wolf, illustrated by bathymetrical charts and temperature sections.

Oceanography—Sea-Temperature. **Mill.**

The Clyde Sea Area. Part III.—Distribution of Temperature. By Hugh Robert Mill. *Trans. R. Soc. Edinburgh*, vol. xxxviii. part i.—(No. 1) —for the Session 1893–94. Edinburgh: R. Grant & Son, 1894. Size 12½ × 9½, pp. 162. *Plates. Price 30s. Presented by the Author.*

Illustrated by 32 plates. A summary of the results is published in the *Journal*, vol. iv., 1894, pp. 344–349.

Photographic Surveying. **Paganini.**

Del rilevamento fototopografico. Relazione dell' Ingegnere P. Paganini. Atti del Primo Congresso Geografico Italiano tenuto in Genova, 1892. Vol. ii. part i. Genoa, 1894. Pp. 107–128.

Physical Geography. *Annales G.* **4** (1895): 129–150. **Lapparent.**

Les grandes lignes de la Géographie physique. Par M. A. de Lapparent.

M. de Lapparent enforces the need of more precision and method in the study of physical geography on the lines laid down by Suess, Penck, and Davis; and then devotes the greater part of his address to the consideration of the larger relations of the continents and oceanic depressions.

River-terraces. *P. Boston S. Natural History* **26** (1894): 257–273. **Dodge.**

The Geographical Development of Alluvial River-terraces. By R. E. Dodge.

Soil and Termites. *M.G. Ges. Wien* **37** (1894): 711–725. **Lenz.**

Ueber die Bedeutung der Termiten für Erdbewegung und natürliche Bodencultur in den Tropenländern. Von Oskar Lenz.
Also a separate copy presented by the Author.

Mr. Lenz treats of the earth-moving power of termites as analogous in its effects to the result of the action of worms investigated by Darwin; but he seems to have overlooked the fact that Livingstone had described the termites' tilling of the soil and stated its economic importance long before Darwin's admirable observations on the earthworm had appeared.

Soils. **Shaler.**

The Origin and Nature of Soils. By Nathaniel Southgate Shaler. In the Twelfth Annual Report of the United States Geological Survey, 1890–91. Part I.—Geology. Washington: Government Printing Office, 1891. Size 11½ × 8, pp. 213–345. *Illustrations.*

An excellent chapter of physical geography dealing with the character and formation of different classes of soils, first in their geological nature, as originating from cliff-talus, glacial action, etc., then as affected by plant and animal life. Certain peculiar soil-conditions are noticed as occurring in swamps, marine marshes, prairies, etc.; and the memoir concludes with a discussion of the action and reaction of man and the soil.

Surveying. **Talbot.**

A Description of the Method of Executing Rapid or Reconnaissance Triangulation, drawn up in the Intelligence Division, War Office. By Major Hon. M. G. Talbot, R.E. London, 1894. Size 5 × 4½, pp. 8. *Presented by the Director of the Intelligence Division.*

Surveying. *B.S.G. Paris* **15** (1894): 228–262. **Caron.**

Instructions pour les Voyageurs. Par E. Caron, Lieutenant de Vaisseau.

Instructions for fixing latitude and longitude astronomically, and making a general survey of the route traversed between the fixed points.

Time-Standards. **Ricchieri.**

L'Italia e l'unificazione mondiale del tempo col sistema dei fusi orari. Memoria del Dott. Giuseppe Ricchieri. Atti del Primo Congresso Geografico Italiano tenuto in Genova, 1892. Vol. ii. part i. Genoa, 1894. Pp. 50–71.

Underground Temperature. *C.R.* **118** (1894): 1164–1167. **Rolland.**

Sur l'accroissement de température des couches terrestres avec la profondeur dans le bas Sahara algérien. Note de M. Georges Rolland.

As a result of many borings for artesian wells in the Sahara, the author concludes that between latitudes 35° and 30° the temperature of the Earth's crust increases at least at the rate of 1° Fahr. in 37 feet, and sometimes more rapidly.

Wind on Mountains. *Le Globe* **33** (1894): 105–133. **Chaix.**

Theorie des Brises de Montagne. Par M. le Prof. Émile Chaix.

Professor Chaix states the two theories of the origin of the diurnal and nocturnal winds of mountain slopes by direct and indirect heating, and points out the importance of more minute observations of the phenomena in order to decide which is more probably correct.

GENERAL.

Anglo-Saxon Unity. **Milne.**

The Federation of the English-speaking people. A talk with Sir George Grey. By James Milne. From the *Contemporary Review*, August, 1894.

Anthropology. **Brinton.**

Nagualism. A Study in Native American Folk-lore and History. By Daniel G. Brinton, Philadelphia, 1894. Size 9½ × 6, pp. 66. *Presented by Francis Parry, Esq.*

Anthropology. **Brinton.**

Reprints of four papers by Daniel G. Brinton, on Anthropological Subjects. *Presented by Francis Parry, Esq.*

These papers are "On the words 'Anahuac' and 'Nahuatl;'" "The Taki, the Svastika, and the Cross in America;" "Characteristics of American Languages;" "A vocabulary of the Nanticoke district," and are reprinted from various journals.

Anthropology. ———

Eight Anthropological pamphlets (mainly American). *Presented by Francis Parry, Esq.*

These pamphlets deal with various primitive rites, games, and objects of art characteristic of the American races, and are written by Mr. J. Walter Fewkes, Mr. A. M. Stephen, Mr. A. E. Douglass, Mrs. Z. Nuttall, Mr. J. G. Bourke, and Mr. Stewart Culin.

Baltic Fleet. **Don.**

Reminiscences of the Baltic Fleet of 1855. By Deputy Surgeon-General William Gerard Don, M.D. Privately Printed, 1894. Size 6½ × 4½, pp. 138. *Illustrations. Presented by the Author.*

Dr. Don was one of the third-year medical students to whom temporary commissions as assistant-surgeons were granted during the operations of the Baltic Fleet in 1855, and after forty years he has printed an interesting extract from his log, with illustrations of the Baltic fortresses. There is a vivid account of the bombardment of Sveaborg.

Bibliography—Oriental. **Scherman.**

Orientalische Bibliographie begründet von August Müller. . . . Bearbeitet von Dr. Lucian Scherman, herausgegeben von Dr. Ernst Kuhn. VIII. Jahrgang. Erstes Halbjahrsheft. Berlin: Reuther & Reichard, 1895. Size 9 × 6, pp. 136.

Biographical Dictionary. **Lee.**

Dictionary of National Biography. Edited by Sidney Lee. Vol. xl. Myllar—Nicholls. London: Smith, Elder & Co., 1894. Size 10 × 7, pp. vi. and 452. *Price* 15*s.*

The following names, more or less of geographical interest, appear among the notices in the present volume: Robert Cornelis Napier (Lord Napier of Magdala), by Colonel R. H. Vetch; Walter Neale, by Gordon Goodwin; and Thomas John Newbold, by W. A. S. Hewins.

Biographical Dictionary. **Lee.**

Dictionary of National Biography Edited by Sidney Lee. Vol. xli. Nichols—O'Dugan. London: Smith, Elder & Co., 1895. Size 10 × 7, pp. vi. and 456. *Price* 15*s.*

The following names of geographical interest and importance appear among the notices in the present volume: Frederick Lewis Norden, by Warwick Wroth; Robert Norris, by the late H. Manners Chichester; and Francis Oates, by G. C. Boase.

Biography—Brugsch. *Deutsche Rundschau G.* 17 (1894): 136–139. **Wolkenhauer.**

Heinrich Brugsch. Von W. Wolkenhauer. *With Portrait.*

Biography—D'Entrecasteaux. *B.S.G. Paris* (1894): 263–402. **Hulot.**

D'Entrecasteaux, 1737–1793. Par le baron Hulot. *With Portraits and Map.*

M. de Hulot here publishes the first complete biography of the famous French navigator d'Entrecasteaux, all previous writers having contented themselves with giving an account of his last great voyage in search of Lapérouse. The memoir is illustrated by portraits, and has a short bibliography.

Biography—Frere. **Martineau.**

The Life and Correspondence of Sir Bartle Frere, Bart., G.C.B., F.R.S., etc. By John Martineau. 2 vols. London: John Murray, 1895. Size 9 × 6, pp. (vol. i.) xi. and 516; (vol. ii.) vii. and 469. *Maps, Portraits, and Illustrations. Price* 32*s. Presented by the Publisher.*
Another copy presented by Lady Frere.

This biography will receive special notice.

Biography—Leichhardt. *Deutsche Rundschau G.* 7 (1895): 193–203. **Wilke.**

J. W. Ludwig Leichhardt. Von Karl Wilke.

Biography—Mercator. **Dinse.**

Zum Gedächtnis Gerhard Mercator's. Vortrag gehalten in der Gesellschaft für Erdkunde zu Berlin am 8 December 1894, von Dr. Paul Dinse. Sonderabdruck aus den Verhandlungen der Gesellschaft für Erdkunde zu Berlin, 1894. No. 10, Berlin, 1894. Size 9 × 6, pp. 18. *Presented by the Author.*

Biography—Novara. *B. S. G. Italiana* (3) 7 (1894): 101–121; 825–839. **Borsari.**

Domenico Maria Novara. Memoria postuma del Prof. Ferdinando Borsari.

Biography—Ramsay. **Geikie.**

Memoir of Sir Andrew Crombie Ramsay. By Sir Archibald Geikie. London: Macmillan & Co., 1895. Size 9½ × 6, pp. xii. and 398. *Portraits. Price* 12*s.* 6*d. Presented by the Publishers.*

An admirable memoir, which in the compass of one short volume presents in miniature the personality of one of the pioneers of British physical geography as well as of geology; and gives concurrently a brief history of the growth and work of the Geological Survey. An interesting feature of the book is the inclusion of a series of portraits of Sir Andrew Ramsay's contemporaries and colleagues.

British Association Report. ——

Report of the Sixty-fourth Meeting of the British Association for the Advancement of Science, held at Oxford in August, 1894. London: John Murray, 1894. Size 9 × 6, pp. cviii., 852, and 118. *Plates. Presented by the Association.*

Colonial Expansion. *J. R. Colonial I.* **26** (1894-95): 7-33. **Shaw.**

"Colonial Expansion." By Miss Flora L. Shaw.

Columbus. *National G.M.* **6** (1894): 179-192. **Redway.**

The First Landfall of Columbus. By J. W. Redway. *With Maps.*

Mr. Redway claims to adduce material evidence that the first landfall of Columbus was not Watling Island, but Samané. He suggests that previous historians have paid too little attention to early maps.

Columbus Documents. ——

Raccolta di Documenti e Studi pùbblicati dalla R. Commissione Colombiana pel Quarto Centenario dalla Scoperta dell' America. Parte v.—vol. i.; Parte ii.—vol. ii.; Parte v.—vol. iii. Rome, 1894. Size 16 × 11½. *Plates.*

Commercial Geography. **Mulhall.**

The Carrying Trade of the World. By Michael G. Mulhall. *Contemporary Review*, December, 1894. Size 10 × 6½, pp. 10.

Commercial Geography. ——

Commercial, No 7 (1894). Index to Reports of Her Majesty's Diplomatic and Consular Representatives abroad on Trade and Subjects of General Interest. With Appendix. 1886-1894. London: Eyre and Spottiswoode, 1894. Size 9½ × 6, pp. 464. *Price* 1*s.* 9½*d.*

Commercial Geography—Tea. *J.S. Arts* **43** (1895): 189-205. **Stanton.**

Tea. By A. G. Stanton. With Discussion.

A most interesting chapter in commercial geography, describing the gradual decline and fall of the China tea-trade of Great Britain, the rise of Indian and Ceylon tea in importance, with particulars of the tea-growing districts of India and Ceylon, and statistics of the trade illustrated by diagrams and a map.

Commercial Geography—Silkworms. **Wray.**

Perak Museum Notes, No. 1. On the Experimental Culture of Silkworms in Perak, together with a paper on the Malayan Fish-Poison "Aker Tuba," and a note on a lightning discharge in Taiping. Also a note on the Black Limestone at Kamuning. By L. Wray, jun. Taiping, 1893. Size 9½ × 6½, pp. 30. *Plate and Plan.*

Eastern Europe and Western Asia. **Callan.**

From the Clyde to the Jordan: narrative of a Bicycle Journey By Hugh Callan. London: Blackie & Son, 1895 [1894]. Size 8 × 5½, pp. 312. *Map and Illustrations. Price* 6*s. Presented by the Publishers.*

An unpretending and interesting account, which is pleasant to read, of the journey of an observant bicyclist through France, Switzerland, Tyrol, across the Brenner pass, through the southern Austrian crown-lands, Servia, Bulgaria and Rumelia to Constantinople, thence through Anatolia and over the Taurus to Syria, and finally Jerusalem. For a boy or girl, we can imagine no better stimulant to the study of political geography.

Educational. **Porena.**

Delle vicende e degli ordinamenti dell' insegnamento geografico nelle scuole primarie dalla costituzione del Regno, e proposte dei mezzi per migliorarlo. Relazione del prof. T. Porena. Atti del Primo Congresso Geografico Italiano tenuto in Genova, 1892. Vol. ii. part ii. Genoa, 1894. Pp. 525-537.

Educational. **Langler.**

Langler's Picturesque Geographical Readers. Edited by John R. Langler. First Standard (pp. 120); Second Standard (pp. 128); Third Standard (pp. 184); Fourth Standard (pp. 192). London: W. H. Allen & Co. Size 7 × 4½. *Illustrations. Price respectively* 8*d*., 10*d*., 1*s*., 1*s*. 6*d*.

This series is carefully prepared, and compares well with other works of the same class.

Educational—Methods. **Robertson.**

Is the Earth a Planet? A study in Physical and Mathematical Geography. By C. Robertson, M.D. Edinburgh: Printed by St. Giles' Printing Company. Size 7½ × 5, pp. 68. *Illustrations. Presented by the Author.*

This pamphlet is preserved as a curious example of the too-common failure of the usual methods of geographical education to convince an intelligent man of the truth of the fundamental fact that the Earth is a planet.

Educational—Pictures. **Frey.**

Mittelschweiz. Geographisch-Kommerzielle Gesellschaft in Aarau. Ein Bilderregen. Separatabdruck aus dem feuilleton der "Neuen Zürcher Zeitung," vom 29-31 März 1894. Von Adolf Frey. Aarau, 1894. Size 9 × 6½, pp. 15. *Presented by the Author.*

Account of an exhibition of educational pictures held in Aarau in May, 1894.

General Geography. **Scobel.**

Geographisches Handbuch zu Andrees Handatlas mit besonderer Berücksichtigung der politischen, kommerziellen und statistischen Verhältnisse. . . . herausgegeben von A. Scobel. Zweite . . . Auflage. Bielefeld und Leipzig, Velhagen & Klasing, 1895. Size 10 × 6½, pp. x. and 802. *Maps. Presented by the Publishers.*

A revised edition of the recently published companion to Andree's Handatlas.

Geography. *Scottish G. Mag.* **11** (1895): 49–56. **Mill.**

The Geographical Work of the Future. By Hugh Robert Mill. *With Diagrams.*

Also a separate copy, presented by the Author.

One diagram represents the area of the unknown Arctic and Antarctic regions compared with Europe, the other a scheme of the subdivisions of geography.

Harbours. **Shaler.**

The Geological History of Harbors. By Nathaniel Southgate Shaler. Thirteenth Annual Report of the United States Geological Survey, 1891–92. Part II.—Geology. Washington: Government Printing Office, 1893. Size 11½ × 8, pp. 93–209. *Illustrations.*

Professor Shaler classifies natural harbours according to their geological origin through deltas, fjords, moraines, lagoons, craters, etc., and after considering the geological causes which tend to improve or impair harbours, he concludes with a review of the harbours of North America, with special reference to those of the United States. Numerous plans of typical harbours are given, and the whole work is published in the fine style which has given to the memoirs of the United States Geological Survey the character of *editions de luxe*.

Historical. **Coote.**

The Voyage from Lisbon to India, 1505–6, being an Account and Journal by Albericus Vespuccius, translated from the contemporary Flemish, and edited with Prologue and Notes by C. H. Coote. London: B. F. Stevens, 1894. Size 9 × 6, pp. xxvii. and 56. *Price* 15*s*.

This interesting little book contains a facsimile of the old Flemish tract, with an interleaved translation. Only two copies of the original are known, one in the British Museum, the other in America. Mr. Coote asserts that his "text, taken on its own merits, has as good a claim to be admitted into the Vespuccian Canon as the *Epistola* [1504], the *Lettera* [1505], the St. Dié *Cosmographiæ Introductio* [1507], or any edition of the *Mundus Novus* published down to the time of the decease of Vespucci in 1512." Critics may, however, be disposed to question the possibility of Vespucci having made a voyage to India at the date assigned.

Historical—Ancient Egyptian Ideas. **Moktar Pacha.**

La figure de la terre connue des anciens Egyptiens. Relation de M. Mohammed Moktar Pacha. Atti del Primo Congresso Geografico Italiano tenuto in Genova, 1892. Vol. ii. part i. Genoa, 1894. Pp. 44–49.

Historical—Discovery of America. **Nocentini.**

La Scoperta dell' America, attribuita ai Cinesi. Relazione di Lodovico Nocentini. Atti del Primo Congresso Geografico Italiano tenuto in Genova, 1892. Vol. ii. part i. Genoa, 1894. Pp. 312-323.

Historical Geography. **Gallois.**

[Criticism of Mr. Harrisse's 'Discovery of North America,' by L. Gallois.] (Extrait de la *Revue historique*, tome lv., 1894.) Size 10 × 6½, pp. 19. *Presented by the Author.*

Historical Geography. **Pennesi.**

Giuseppe Pennesi: Pietro Martire d'Anghiera e le sue relazioni sulle scoperte oceaniche. Rome, Auspice il Ministero della Pubblica Instruzione, 1894. Size 16 × 12, pp. 110. *Presented by the Author.*

An excerpt from the great work published by the Italian Government in commemoration of the fourth centenary of Columbus' voyage.

Historical Maps. *Rev. G.* 35 (1894): 433-445. **Drapeyron.**

L. Drapeyron: Le premier Atlas national et la Ménippée de Tours (1594). Troisième centenaire.

Historical Maps. **Wagner.**

Die Rekonstruktion der Toscanelli-Karte v. J. 1474 und die Pseudo-Facsimilia des Behaim-Globus v. J. 1492. Vorstudien zur Geschichte der Kartographie, III. Von Hermann Wagner. (Aus den Nachrichten der K. Gesellschaft der Wissenschaften zu Göttingen. Philolog.-historische Klasse, 1894. No. 3.) Size 9½ × 6½, *facsimile. Presented by the Author.*

This will be referred to in the Monthly Record.

Hygiene. **Mears.**

The Preservation of Health in the Far East. Hints as to Clothing, Food, and Residence in China. By W. P. Mears. London: Church Missionary Society, 1895. Size 8½ × 5½, pp. 48. *Plans. Presented by the Author.*

Plain practical instructions as to the means of preserving health in China, and the arrangements necessary in building houses for Europeans to occupy.

Indian Ocean—Wrecks. **Creagh.**

Government of India. Finance and Commerce Department. Return of Wrecks and Casualties in Indian Waters for the year 1893, together with a Chart showing the position in which they occurred, and a Diagram showing comparative numbers of the reported maritime casualties, etc., the total tonnage, and the number of lives lost, for the past eighteen years. Prepared by Commander B. P. Creagh, Calcutta, 1894. Size 13 × 8½, pp. 64.

Koran. ———

The Koran, commonly called the Alkoran of Mohammed. Translated into English from the Original Arabic. With explanatory notes taken from the most approved commentators. To which is prefixed a Preliminary Discourse. By George Sale. Loudon: F. Warne & Co. [not dated]. Size 7½ × 5, pp. xv., 145 and 470. *Price* 2*s.*

Lightning. **McAdie.**

U.S. Department of Agriculture, Weather Bureau, Circular of Information: Protection from Lightning. By Alexander McAdie. Washington, 1894. Size 9 × 5, pp. 20. *Plates. Presented by the U.S. Weather Bureau.*

The illustrations show numerous photographs of lightning-flashes, and of damage done by lightning in the United States.

Migrations. **Levasseur.**

Sur l'expansion de la race européenne hors d'Europe depuis la découverte de l'Amérique. Communication de M. E. Levasseur. Atti del Primo Congresso Geografico Italiano tenuto in Genova, 1892. Vol. ii. part ii. Genoa, 1894. Pp. 352-366.

Migrations. **Semenow.**

Le Mouvement colonisateur de la race européenne vers l'Orient. Communication de S. E. M. J. de Semenow. Atti del Primo Congresso Geografico Italiano tenuto in Genova, 1892. Vol. ii. part ii. Genoa, 1894. Pp. 367-381.

Mountaineering. *Z. Deuts. u. Oesterr. Alpenvereins* 25 (1894): 95–176. **Purtscheller.**

Zur Entwickelungsgeschichte des Alpinismus und der alpinen Technik in den Deutschen und Oesterreichischen Alpen. *With Illustrations.* Von L. Purtscheller.

Museum. ——

Field Columbian Museum. Pub. i., vol. i. No. 1. An Historical and Descriptive Account of the Field Columbian Museum. Chicago, December, 1894. Size 9½ × 6½, pp. 90. *Plans and Illustrations. Presented by the Director.*

This museum is designed to perpetuate the World's Columbian Exhibition at Chicago.

Museum Handbook. ——

Guide to the Field Columbian Museum. With Diagrams and Descriptions. Second Edition. Chicago, 1894. Size 7½ × 5, pp. 263. *Presented by the Director of the Museum.*

Navigation—Lighthouses. ——

No. 31. U.S. Hydrographic Office. List of Lights of the World. Vol. II. South and East Coasts of Asia and Africa and the East Indies, including Australia, Tasmania, and New Zealand. Revised and corrected to November 30, 1894. Washington: Government Printing Office, 1894. Size 11½ × 9, pp. 64 and xv. *Presented by the U.S. Hydrographic Office.*

Oriental Life. **Trumbull.**

Studies in Oriental Social Life, and Gleams from the East on the Sacred Page. By H. Clay Trumbull, D.D. London: Hodder and Stoughton, 1895. Size 8½ × 6, pp. xviii. and 438. *Illustrations. Price* 6*s*. *Presented by the Publishers.*

Oriental Literature. **Max Müller.**

The Sacred Books of the East. . . . Edited by F. Max Müller. Vols. xxxv., xxxvi., and xlix. Oxford: the Clarendon Press, 1890–94. Size 9 × 6, pp. (vol. xxxv.) xlix. and 320; (vol. xxxvi.) xxvii. and 388; (vol. xlix.) xiii. and 208. *Presented by the Secretary of State for India.*

Ordnance Survey. *Quarterly Rev.* (1895): 36–60. ——

The Ordnance Survey.

A vindication of the Ordnance Survey from recent criticisms, and a brief summary of the history of surveys of high precision in Europe. The history of the Ordnance Survey, and of the various incidents, accidents, and changes in the production of the various maps, are dealt with in some detail and with an air of authority. An opinion on the value of the hill-shaded one-inch map on p. 49, ascribed to Sir A. Geikie, was, however, really written by Professor James Geikie.

Patents. **Fulton.**

A Practical Treatise on Patents, Trade Marks, and Designs, with a Digest of Colonial and Foreign Patent Laws; the text of the Patents, Designs, and Trade Marks Acts 1883 to 1888 (Consolidated), etc. By David Fulton. London: Jordan & Sons, 1894. Size 9 × 6, pp. xxiv. and 488. *Price* 15*s*. *Presented by the Publishers.*

This volume includes a general sketch of the patent laws in all countries and British colonies.

Place-Names. **Gambino.**

Sull' Ortografia e l'Ortoepia dei nomi geografici nell' insegnamento e sulle norme per la pubblicazione d'un dizionario di pronunzia geografica secondo il voto del Congresso internazionale di Berna. Comunicazione del Prof. G. Gambino. Atti del Primo Congresso Geografico Italiano tenuto in Genova, 1892. Vol. ii. part ii. Genoa, 1894. Pp. 684–686.

Place-Names. *B. S. Khédiviale G.* 4 S. (1894): 205–231. **Nallino.**

La transcription des noms géographiques arabes, persans et turcs. Par C. A. Nallino.

Arguments in favour of the Khedivial Geographical Society undertaking the compilation of a dictionary of transcriptions of place-names from the Arabic, Persian, and Turkish, in the Roman alphabet. The author proposes two rules: (1) to reproduce exactly the Arabic sounds which are recognized as correct by all Arabs; and (2) to bring this transcription into conformity with the rules established by the R.G.S., and by the Geographical Societies of Paris and Rome.

Royal Colonial Institute—Library Catalogue. ———

Catalogue of the Library of the Royal Colonial Institute. London; published by the Institute, 1895. Size 11 × 7½, pp. clvi. and 544. *Presented by the Royal Colonial Institute.*

This handsome volume contains a subject catalogue of the books and pamphlets in the library of the Colonial Institute, arranged under fourteen heads, subdivided into seventy sections which give a classification of the literature of each colony in a clear manner, and the whole is unified by an alphabetic catalogue under the authors' names, including books, pamphlets, and articles in journals. Much credit is due to the Librarian, Dr. Boosé, for the admirable execution of the work.

Silica. **Wright.**

Native Silica, a treatise upon a series of quartz, rock crystal, chalcedony, agates, and jaspers, as well as other Earthy and Metalliferous Minerals (Economic and Decorative), with a chapter upon the formation of Agates, cutting, polishing, and staining, with a Descriptive Catalogue of the specimens forming the collection of the late Right Hon. the Earl of Derby, K.G., bequeathed by him to the Liverpool Free Museum. By Bryce Wright. London: Wyman & Sons, 1894. Size 9 × 6, pp. viii. and 264. *Presented by the Author.*

Time Standards. **Floquet.**

L'Unification internationale de l'Heure et la division décimale du temps. Rapport de M. Floquet sur deux publications de M. Rey-Pailhade. Nancy: Berger-Levrault & Co., 1894. Size 9 × 5½, pp. 14. *Presented by the Author.*

Tin-mining. **Wray.**

Perak Museum Notes, No. II. Alluvial Tin Prospecting, including tables for checking the accuracy of bore-holes, and for estimating the amount, richness, and value of the ore obtained from them. By L. Wray, jun. Taiping, 1893. Size 9½ × 6½, pp. 114. *Diagram.*

University Calendar—Japan. ———

Imperial University of Japan. (Tei Koku Daigaku.) The Calendar, 2553–54 (1893–94). Tokio (1894). Size 8 × 5½, pp. iii., 265, and 12. *Plans. Presented by the President of the University.*

Zoopraxography. **Muybridge.**

Descriptive Zoopraxography, or the science of Animal Locomotion made popular. By Eadweard Muybridge, with selected outline tracings reduced from some of the illustrations of 'Animal Locomotion.' An electro-photographic investigation of consecutive phases of animal movements, commenced 1872, completed 1885, and published 1887, under the auspices of the University of Pennsylvania. University of Pennsylvania, 1893. Size 8 × 5½, pp. xii. 44, 34, and 14. *Illustrations and Portrait. Presented by the Author.*

NEW MAPS.

By J. Coles, *Map Curator*, R.G.S.

EUROPE.

Bulgaria. **Herbert.**

Eight maps and plans made to illustrate Mr. W. V. Herbert's book, 'The Defence of Plevna,' 1877. Published by Longmans, Green, & Co., 1895. *Presented by the Author.*

England and Wales. **Ordnance Survey.**

Publications issued since February 8, 1895.

1-inch—General Maps:—

England and Wales:—318, 356, hills engraved in black or brown, 1*s*. each.

Ireland:—177, hills, 1*s*.

6-inch—County Maps:—

England and Wales:—**Lancashire**, 51 s.e., 56 s.e., 57 s.e., 60 s.w., 62 n.e., 63 n.w., n.e., 64 s.e., 65 s.w., 81 s.e., 95 n.e., 105a n.w. **Yorkshire**, LXXXIX. n.w., s.e., CLXXXIX. s.e., CXC. s.e., CCII. s.w., CCIII. n.e., s.e., CCIV. s.e., CCXIV. n.e., CCLVIII. s.e., 1*s*. each.

25-inch—Parish Maps:—

England and Wales:—**Yorkshire**, VI. 16, 4*s*.; XVI. 1, 5*s*. **Lancashire**, LXXXIX. 4, 12, 4*s*. each, coloured.

Town Plans—5-feet scale:—

London (Revision), VI. 19, 46, 68, 79, 80, 86; VIII. 33; X. 24, with houses stippled, 2*s*. 6*d*. each.

——— 10-feet scale:—

London—Re-survey (Hornsey Parish), III. 53, 2; III. 55, 1; III. 65, 4, 2*s*. 6*d*. each.

——— 5-feet scale:—

Stockport (Revised), III., IV., 2*s*. 6*d*. each. Index, 2*d*. This town will be completed in 12 sheets.

(*E. Stanford, Agent.*)

Italy. **Fritzsche.**

Die Verbreitung der Malaria in Italien. Nach der amtlichen Karte reduziert von W. G. Fritzsche. Scale 1 : 4,000,000 or 64·7 stat. miles to an inch. Petermann's 'Geographische Mitteilungen,' Jahrgang 1895. Tafel 3. Justus Perthes, Gotha, 1895. *Presented by the Publishers.*

Norway. **Institut Geographique de la Norvége.**

Topografisk kart over kongerit Norge. Scale 1 : 100,000 or 1·6 stat. mile to an inch. Sheets:—1D, Mandal; I. 18, Velfjorden; 2C, Oksö; 9A, Kragerö; Z. 7, Eidfjeld; Æ. 5, Neiden; Æ. 6, Svanvik; Æ. 7, Gravefos. Norges Geologiske Undersögelse. Scale 1 : 100,000 or 1·6 stat. mile to an inch. Sheet "Gausdal."—Specialkarte over den Norske Kyst fra Lyngvœr til Strömöerne, B. 46, 1 : 50,000, 1894.—Specialkarte over den Norske Kyst fra Justö til ny Hellesund, B. 9, 1 : 50,000.—Specialkarte over den Norske Kyst fra ytre Torungen til Lillesand og Justö, 1893, 1 : 50,000. *Presented by the Institut Geographique de la Norvége.*

ASIA.

Formosa. **Kirchhoff.**

Karte von Formosa nach den besten Quellen entworfen von Prof. Dr. A. Kirchhoff. Scale 1 : 1,600,000 or 25·2 stat. miles to an inch. Petermann's 'Geographische Mitteilungen,' Jahrgang, 1895. Tafel 2. Justus Perthes, Gotha, 1895. *Presented by the Publisher.*

India Government Surveys. **Surveyor-General of India.**

Indian Atlas, 4 miles to an inch. Quarter Sheets: No. 6 n.e., part of district Dera Ismail Khan (Punjab); 15 n.w., parts of districts Bannu, Kohat, and Rawal Pindi (Punjab); 28 s.w., parts of districts Hazara and Rawalpindi (Punjab), and of Kashmir State; 31 s.w., parts of districts Sirsa and Bahawalpur (Native State, Punjab). Bickaneer (Native State, Rajputana Agency); 32 n.e., parts of district Hissar and Loharu, Native State (Punjab) and State of Bickaneer (Rajputana); 42 n.e., parts of districts Shimoga and Chitaldroog (Mysore); 42 s.e., parts of districts Shimoga, Kadur, and Chitaldroog (Mysore) and Dharwar (Bombay); 49 n.w., parts of districts Rohtak, Hissar, Karnal, and Delhi, and of Native States Jind, Dujama, and Loharu (Punjab); 129 s.e., parts of districts Lakhimpur and Sibsagar and of Naga Tribes (Assam).—Sheets: 107, parts of districts Sambalpur, Patna, and Kalahandi (Central Provinces), etc.; 121, districts 24 Parganas, Hooghly, etc. (Bengal).—Bengal Survey, 1 inch to a mile, Portions of Sheets Nos. 166 and 195, district Cuttack, Seasons 1878–79 and 1888-89; No. 196, district Cuttack, Seasons

1878–79 and 1888-89; No. 271 (2nd edit.), district Darjeeling, Jalaiguri, and Purnea, Seasons 1840–47, 1858–59, and 1861-67.—Bombay Survey, 1 inch to a mile, No. 85, parts of Western Rajputana and Palanpur Political Superintendency, Season 1890–91; No. 183, parts of Panch Mahals district and States of Baroda, Chhota Udepur, and Bariya, Seasons 1883–84 and 1890–91; No. 190, parts of district Nasik and of the Dang, Baroda, Bansda, and Dharampor States, Seasons 1879–80, 1882–83, 1884–85, 1886-87; No. 223, parts of districts Nasik and Khandesh, Seasons 1875–76 and 1879–80; No. 272, portions of Belgaum District and Native States under Kolhápur Agency, Season 1891–92.—Punjab Survey, 1 inch to a mile; No. 214, district Ferozepore and Bahawalpur State, Season 1869–70 and 1877–79.—North-West Provinces and Oudh Survey; No. 32, districts Meerut Bulandshahr and Moradabad, Season 1873–74, 1876–77, and 1881–82; No. 98, districts Naini Tal, Bareilly and Kheri, Seasons 1866–68, 1871–72, and 1887–88; No. 146, district Bahraich, Seasons 1865–68.—Hyderabad Survey, 1 inch to 2 miles, Sheet Nos. 204, 205, 214, 215, 222 (on one), Khamamet Circar, Season 1823–24.—Central India and Rajputana Survey, 1 inch to a mile; No. 57, part of Jodhpore State, Seasons 1878–79 and 1890–91.—Lower Burma Survey, 1 inch to a mile, Sheets Nos. 232 and 279 (on one), districts Henzada, Hanthawaddy, Tharrawaddy and Thongwa, Seasons 1882–84 and 1888–89; No. 235, districts Hanthawaddy and Thongwa, Seasons 1880-82 and 1887-90; No. 564; district Mergui, Season 1892–93; No. 572, district Mergui, Season 1891–92; 572A, district Mergui, Season 1891-92.—North-Eastern Frontier, 1 inch to 4 miles; Sheet No. 22 N.W. (3rd edit.); parts of district Lakhimpur (Assam) and of Singpho, Naga Hills and Bor Hkamti Country, Seasons 1876–77, 1884–85 and 1887–88.—Berar, 1 inch to 24 miles, 1894.—District Tippera, Lower Provinces (Bengal), 4 miles to an inch, 1894.—District Ajmere, Rajputana, 8 miles to an inch, 1894.—District Hamirpur, N.W. Provinces and Oudh, 8 miles to an inch, 1894.—District Saharanpur, N.W. Provinces and Oudh, 1894. *Presented by H.M. Secretary of State for India, through the India Office.*

AFRICA.

Madagascar. **Grandidier.**

Madagascar d'après les travaux d'Alfred Grandidier. Scale 1: 3,000,000 or 47·8 stat. miles to an inch. Paris, Andriveau-Goujon, 1895. *Price* 1*s.*

Transvaal Goldfields. **Stanford.**

Stanford's map of the Transvaal Goldfields, British Zululand. The Delagoa Bay Railway and the routes from Cape Colony and Natal. Scale 1 : 1,000,000 or 15·7 stat. miles to an inch. 1895. E. Stanford, London. *Price* 8*s.*

The title of this map sufficiently indicates the area it embraces. The positions of the goldfields are shown, and an inset, on an enlarged scale, is given of the Witwatersrand Goldfields. All the railways are indicated, and have been brought up to date, and routes from the Cape Colony and Natal to places marked on the map are laid down. As there is no hill-shading on the map, it does not, with the exception of the hydrography, indicate the nature of the country; but in other respects it will be found a useful map for general reference.

GENERAL.

Ancient World. **Miller.**

Mappaemundi. Die ältesten Weltkarten. Herausgegeben und erläutert von Dr. Konrad Miller. II. Heft:—Atlas von 16 Lichtdruck-Tafeln. Jos. Roth'sche Verlagshandlung Stuttgart, 1895. *Price* 5*s. each part.*

This is the second issue of this series, and contains the following facsimile maps:—1, Psalter Karte von London; 2, Beatus Karte 2 (Paris II.); 3, Beatus Karte 3, u. 8, Osma u. Gerona; 4, Beatus Karte 4, Ashburnham; 5, Beatus Karte Valladolid; 6, Beatus Karte 6, Madrid; 7, Beatus Karte 7, London; 8, Beatus Karte 9, Turin; 9, Beatus Karte 10 (Paris, III.), 10 Cottoniana, London; 11, Hieronymus 1, London; 12, Hieronymus 2, London; 13, Heinrich v. Mainz, London; 14, Ranulf Higden 1, London; Ranulf Higden 2, London; 16, Ranulf Higden 5 u. 6, London u. Cambridge. These are all photographic reproductions.

Educational. **Lüddecke.**

Deutscher Schulatlas, Mittelstufe, 71 Karten und 7 Bilder auf 42 Seiten. Von Dr. R. Lüddecke. Justus Perthes, Gotha, 1895. *Price M.* 2.60.

On the inside of the cover of this atlas a very full explanation is given of the colouring and the symbols employed in the maps, as well as a list of abbreviations used. The first sheet contains a set of plans to illustrate the scales employed in the production of maps, and this is followed by a series of maps showing typical methods of cartography employed to represent the relief of the Earth's surface. Several sheets are devoted to Germany, the remainder being such maps as are usually found in school atlases, both physical and political. The maps are free from the fault of being overcrowded with names, the physical maps are orographically coloured, political boundaries are distinctly shown, and the atlas is, in all respects, well adapted to the purpose for which it has been published.

Historical Geography. **Schrader.**

Atlas de Géographie Historique. Ouvrage contenant 54 grandes Cartes doubles en couleurs, accompagnées d'un Texte Historique au dos et d'un grand nombre de Cartes de Détail, Figures, Diagrammes, etc. Par une Réunion de Professeurs et de Savants sous la direction Géographique de F. Schrader, directeur des travaux cartographiques de la librairie Hachette et Cie. Paris: Hachette et Cie, 1894. Livraison 11e. *Price* 1 *fr.* 50 *c. Presented by the Publisher.*

Sheet No. 35 contains a map of the world in 1740, with insets of the English colonies, and French possessions in North America at that period. Sheet 39 is a map of the formation of the Indian Empire, commencing with the acquisitions under Lord Clive, 1756–1766, and ending with those under the Marquis of Dufferin, 1885-1886. As usual with this atlas, each map is accompanied by well written historical notes, illustrated by small maps.

The World. **Debes.**

E. Debes' Neuer Handatlas über alle Teile der Erde, in 59 Haupt und weit über 100 Nebenkarten, mit alphabetischen Namenverzeichnissen. Ausgeführt in der geographischen Anstalt der Verlagshandlung. Leipzig: H. Wagner & E. Debes. Parts XI., XII., XIII., XIV., XV., XVI., XVII., *Price* 1·80 *marks each Part. Presented by the Publishers.*

Part XI. contains the following maps: Climate map of the world, Austro-Hungary, South and Central Scandinavia; Part XII. Temperature, current, rain, population, and religion maps of the world, and maps of East Germany and West Africa; Part XIII. West Asia, Australia, and North America; Part XIV. Political and commercial maps of Europe, Southern Germany, and Balkan Peninsula; Part XV. Physical maps of the world in hemispheres, Spain and Portugal, and a general political map of Africa; Parts XVI. and XVII. (in one) Title and table of contents, political map of Asia, North-West Africa, South Africa, the Valley of the Nile, Equatorial Africa, Eastern United States, and a political map of South America.

With the issue of Parts XVI. and XVII. this atlas is complete. It contains in all 59 principal maps and numerous insets. The style in which the maps are drawn reflects credit on all who have had a hand in their production. Except in the case of general maps relating to physical geography, etc., each sheet is furnished with a copious index. The colouring is well chosen, and the hill-shading is not only effective, but, being in light brown, does not interfere with the lettering. The depths of the ocean are indicated by different shades of blue, and, taken as a whole, it is an excellent atlas for the purpose of general reference, while its price places it within the reach of many persons who cannot afford the more expensive atlases.

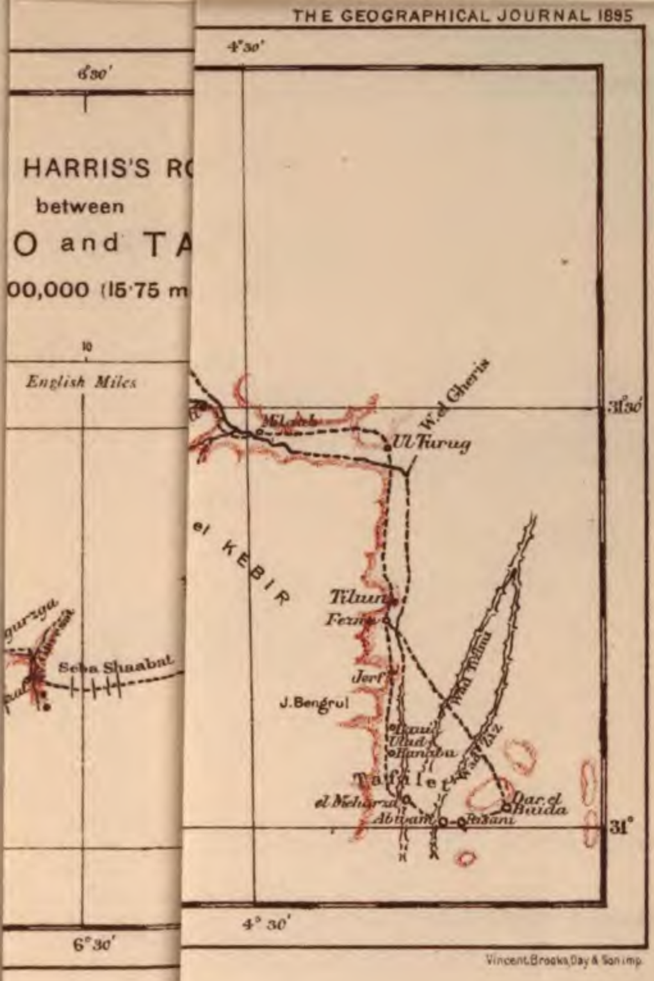
PHOTOGRAPHS.

Bashan. **Robinson Lees.**

32 Photographs of Southern Bashan, taken by G. Robinson Lees, Esq., 1893. *Presented by G. Robinson Lees, Esq.*

This is a very interesting series of photographs illustrating the scenery and antiquities of Southern Bashan.

N.B.—It would greatly add to the value of the collection of Photographs which has been established in the Map Room, if all the Fellows of the Society who have taken photographs during their travels, would forward copies of them to the Map Curator, by whom they will be acknowledged. Should the donor have purchased the photographs, it will be useful for reference if the name of the photographer and his address are given.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Geographical Journal.

No. 5. MAY, 1895. VOL. V.

CHITRAL, HUNZA, AND THE HINDU KUSH.*

By Captain F. E. YOUNGHUSBAND, C.I.E., Indian Staff Corps.

IT is with a good deal of compunction that I address you on these states of the Hindu Kush which are to form the subject of my lecture to-night, for I feel that the honour of doing so should have fallen on others than myself. I was not the first, by many, to explore and open up these states. Many had gone before me, and all that I could do was to follow in the steps of these first pioneers, and carry on the work which they had commenced. Poor Hayward, the first intrepid Englishman who pushed his way into these mountain recesses, never returned to tell the tale of what he saw, for he was cruelly murdered in Yasin in 1870. But Biddulph, the first to visit Chitral and the first to visit Hunza, might well have borne the privilege which is now falling to me. And Macnair, Sir William Lockhart and the members of his mission, Mr. Ney Elias, Colonel Durand, Mr. Robertson, Captain Tyler, R.E., were all my predecessors, and could have told a more interesting tale than mine of how they found these primitive, picturesque hill-men at their very first touch with the outside world.

But while I cannot lay claim to your attention as the first to visit this interesting region, I can, at least, ask it as the last to do so. It has been my privilege to represent the British Government in both Hunza and Chitral, and it is only a few months ago that I returned from the latter place, after a stay of more than two years among these little states of the Hindu Kush.

Before, however, proceeding to any description of these, it is necessary for me to put clearly before you the reasons why these regions should especially interest you. These are many. There are, first, the political and military reasons. Here is the point where, as the title of Mr. Knight's remarkably interesting book runs, 'Three Empires Meet.' The Indian, the Russian, and the Chinese empires all meet here, and where three such empires meet the eyes of the people who inhabit them must naturally be turned.

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* Paper read at the Royal Geographical Society, Monday, March 25, 1895. Map, p. 512.

To the members of a scientific society, however, such considerations may possibly not have much weight. These would require some deeper attraction than the mere political boundaries of different races. To such the Hindu Kush affords the highest interest; for we have here mountain ranges of colossal height and only of recent years explored, and races of people of a very primitive type, who, shut up for centuries in their mountain fastnesses, have preserved intact much of their original type of manners and customs.

A LOST SNOWPEAK, HINDU KUSH.
(*From a Drawing by Colonel H. C. B. Tanner.*)

I was brought up a soldier, and became a "political," as we are called in India; my interests were therefore more purely military and political rather than scientific; but as it was a part—the main part, I may say—of my duties to study the character and nature both of the people and the country, I shall hope that some of the impressions I formed of them may prove interesting to you.

The country I am to describe to you, then, is that lying immediately north of Kashmir and south of the Pamirs, which is drained by water flowing into the Indus, and comprises the states of Hunza, Nagar, and Chitral. It is an entirely mountainous country, with never a stretch of plain more than 3 or 4 miles in length. The valleys are all deeply cut, and even the lowest mountains are 13,000 or 14,000 feet in height, while some rise to 25,000. The nature of the mountains will best be gathered from the lantern slides I propose to show you. Except in the lower part of Chitral and in occasional secluded side valleys, they are perfectly bare. In some parts one may travel for march after march without seeing a sign of a tree outside the valley bottoms, and the barren character of these hills has much to do with their forms and with that of the valleys. What we see here are great masses of rocky mountains, their summits in the loftier regions clothed in snow and ice, but in most parts bare, and their bases always so. On these rocks the sun in summer beats down with a force which makes them so hot it is impossible to keep one's hand on them without burning it; and in winter come frosts reaching below zero Fahrenheit, which freezes the draining of the snow and rain in the crevices of the rocks, and breaks them off by the same process as water swollen into ice bursts up our water-pipes. Owing to the extremes of temperature, the rocks in all this region are very loose, so when the snow melts off them at the close of winter, and still more so when a storm of rain or a cloud-burst falls upon these mountains, the whole of their sides is washed of their loose *débris*, which comes pouring down a liquid stream of mud and stones and boulders into the gorges, and there piles itself up till, by the pressure of weight from behind, it is forced out into the more open main valley and then spreads itself out in one of those alluvial fans, or *cones de déjection*, which occur in all mountainous countries, but which are seen in these dry lofty regions of the Hindu Kush in their fullest development. These are one of the most characteristic features of this country, and it is for this reason that I direct your attention to them. The traveller here sees in the distance some big snowy peak, but the greater part of the scene around him is of bare hillside, and the valley bottoms, which to traverse are simply a succession of these alluvial fans separated here and there by some huge rocky bluff, but often running one into the other in a continuous stretch.

The climate of these regions is one of extremes. At Chitral (5000 feet) the maximum I registered was 100°, and at Gilgit (4800 feet) Dr. Roberts recorded a maximum of 110°. These temperatures were in the cultivated parts, where the vegetation makes it cooler. In the bare open valley, where the sun comes with full force on the rocks, it must be certainly greater. As to the minimum, in Chitral in February (I have no January records) the lowest reading was 15°, and in Mastuj (7800 feet) 5° below zero. In Gilgit it is not so cold; the thermometer there does not appear to fall below 20°. The air over most of the region is extremely dry, and the rainfall very small. Nearly all the moisture from the monsoons, which break over the plains of India, is precipitated on the outer ranges of mountains before reaching these remote valleys; and, though not so dry as the countries east and north—for a certain amount of moisture seems to come up the funnel of the Indus valley to Gilgit and Hunza, and over the Bajaur hills to Lower Chitral—the rainfall on the whole is very slight, and the climate dry and healthy.

The people are all Mohammedans, and a great number of them belong to that Maulai sect who look to Aga Khan of Bombay as their chief. They all dress alike, and they are very similar in feature and appearance.

MIDSUMMER SNOWFIELDS LOOKING TOWARDS CHITRAL.
(From a Drawing by Colonel H. C. B. Tanner.)

My first visit to these Hindu Kush states was made in 1889, when I entered Hunza from the north and traversed the length of the country on my way to Gilgit. In 1891 I again crossed the Hindu Kush from the north, and followed down the Ashkuman valley on my way to Gilgit once more. Of these journeys I gave you some account three years ago. I had been a mere bird of passage through the states, and had had no opportunity of really studying them. But in 1892, after holding the appointment of Assistant-Resident in Kashmir for three months, I was delighted to find myself appointed to the important and interesting little state of Hunza.

Since my visit to it three years previously, however, a vast change had taken place. That great potentate, Safder Ali, who had boasted and really believed that he was the equal of his three neighbours the Empress of India, the Czar of Russia, and the Emperor of China, had been obliged to flee from his country, which was now ruled by his younger brother, Mohamed Nazim Khan, an attractive young man who had accompanied me through Hunza on my former visit, and whom I had also met in Sarikol.

It might have been expected that now, only seven months after our little war with these people of Hunza and Nagar, the country would still show signs of disquiet. But anything more quiet and peaceful than these two little states it would be hard to find. My predecessor, Captain Stewart, had been in political charge ever since the war, and to him and the instructions he had received from Colonel Durand at Gilgit must be due the credit that these people, who had only a few months previously been up in open arms against us and fighting us tooth and nail, were now so quiet that British officers could ride anywhere about the country without an escort of any description. The fact is that the people soon recognized that our presence implied no interference with their internal affairs or customs. They were still ruled by their own chiefs and in their own way. The only difference was that they were obliged to have rulers who would preserve peaceful relations with the British Government, and that their incessant raids on Yarkand territory and fightings with the Kashmir troops at Gilgit and amongst themselves had been stopped once and for ever. Whether this result is really satisfactory for them is a question to which we have to pay attention, and seek to solve by peaceful methods. At any rate, the people are now happy and contented, and, with the usual Oriental acceptance of the inevitable, pass their lives as if the sight of British officers in their country was one which they had been accustomed to from their childhood.

The Nagar people are less taking than their neighbours across the river, but the Hunza people are a particularly attractive race. I adhere to the opinion I expressed after my first visit to their country in 1889, that they are not really a fighting people. They do not fight for fighting's sake like a Pathan tribe does. When they did fight, and certainly when they raided, it was more by command of their chiefs than from an impulse of the people themselves. But the fighting and the raiding had created in them a strong, hard spirit, noticeable at once in their faces and in their carriage; and the severity of the climate, and the hardship of existence, in a country only able to support a very limited number of inhabitants, had contributed to the formation of that power of endurance which is so especially remarkable in them. I found them, too, to be a cheery, companionable lot, who would go mad over a game of polo, delight in dancing, and always be ready for a "tamasha" of any description. Every British officer who has been in the country since the war has spoken well of them, and I thought myself very fortunate to have been appointed to superintend such an interesting, attractive state.

And besides the people, the country itself is very fascinating. I had remembered the grandeur of that great mountain Rakapushi from my former visit. But now seeing it again, I found it to even surpass my remembrance of its glories. From Baltit, the capital —if one may apply such a dignified title to a small collection of huts—of Hunza, you look out over a mass of foliage down the valley to the giant mountain mass at the end, a wall of snow of glittering beauty. There were other scenes, too, of almost equal grandeur; but I must not detain you by describing all the beauties of Hunza and Nagar, for that has already been done far more eloquently than I could by Mr. Knight, Mr. Conway, and Mr. Curzon, and the scenes in Hunza are now becoming as familiar as those in the Alps. I will only say, speaking from the point of view of a resident in the country, that they are such as one can never tire of; that each fresh

RAKAPUSHI.
(*From a Drawing by Colonel H. C. B. Tanner.*)

glimpse of Rakapushi's glories, each look across the river to the Golden Parri of Nagar, each new sight of the rugged peaks that tower above the fort at Baltit, seemed to enter deeper into one's soul than the last. They never failed to impress, never palled on one. As things of beauty they were a joy for ever.

While I was quietly enjoying all this grandeur of scenery and all the pleasure of the autumn season in Hunza, with its glowing autumn tints on the trees and frosty invigorating air, I was rudely disturbed one morning from these dreams of peace by an urgent letter from Colonel Durand, the British agent at Gilgit, telling me that the Mehtar of Chitral had been killed, and the throne usurped by an uncle; and that Nizam-ul-Mulk, the elder brother of the man who had been killed, was starting off from Gilgit to make a bid himself for the throne. Colonel Durand was going to protect our frontier with a small force, and he asked me to come down at once to Gilgit with as many Hunza-Nagar men as I could collect to join the little force. The note arrived at 8.30. I had an interview with the Mir as soon as I could. Before 11 I had packed up my things, and handed over charge to Mr. Gurdon, my successor. At 1 that same night I was in Gilgit, 65 miles off, and by 10.30 the next night a hundred men from Hunza and Nagar were there too. That is to say, in about thirty-six hours from the time of receiving the warning, they had covered on foot 65 miles of mountainous country. Nor did they halt at Gilgit. They went straight on by double marches—that is, 20 to 25 miles a day—towards Chitral, where they rendered very important services in the little scrimmage which decided the fate of the usurper, and put Nizam-ul-Mulk on the throne.

I quote this as an instance of the marching powers of these hill-men, and their readiness to start off on a long march at a moment's notice. It is an instance, also, of how readily former enemies can be turned into useful allies. I ought, too, to describe the man who was the moving spirit in this march. He was named Humayun, the principal Wazir and right-hand man of the Mir of Hunza, and the leader of one of the most renowned and successful raids which these Hunza men had ever made upon Yarkand territory. A man of extraordinary ability and force of character, one of the best polo-players in the country, full of go and dash, and a born leader of raids. On one occasion in Hunza I asked the Mir to allow Humayun to take a hundred men and just show me how they would attack a village. Humayun, with great alacrity, collected his men, took a rapid glance round to grasp the situation, and then in clear, quick words he gave his orders, dividing his men into two parties, each under a leader, and pointing out to them how the attack was to be made, the objective point of each party, and the general line by which they were to reach it. With wonderful dash each party then set off. They rushed at full speed from rock to rock, seized every point of cover in the most perfect manner, and finally joined in a combined attack on the village. The whole thing was a most interesting exhibition, and what struck me most about it was the dash, the promptitude, and the intelligence with which it was carried out, without any preparations, on the spur of the moment.

As I have said so much about the intelligence of these people in the science of war, I feel I ought, before changing the scene to Chitral, to say something of their aptitude for the arts of peace. Behind the fort at Baltit is a cliff beetling over a mountain torrent flowing down from the snow-peak in the background, and right along the face of this cliff may be seen a watercourse constructed there by the men of Hunza with but few other instruments than the curved horns of the ibex. Iron tools were until recently almost unknown in the country. Yet, with the simple means at their disposal, they had made a way for the water round the cliff, piling up stones and earth where it was at all possible to do so, and, with props and logs of wood let into the cliff, had made galleries round the more precipitous parts. In one portion—through the old morraine of a glacier—they had made a tunnel, scooped out entirely with ibex-horns. The water was then conducted in a wide channel for 6 or 7 miles through the cultivated lands of Hunza. Altogether this water-channel was a very good illustration of the ingenuity these rough people possess, and of their ability to do much with a very little.

CHITRAL VALLEY, LOOKING SOUTH.
(From a Photograph by Captain Younghusband.)

I must now turn to Chitral. I fear it is too much to expect you to follow me through the kaleidoscope of events which has occurred during the last two and a half years in the country, but I will attempt to put them before you as clearly as possible. Up to September, 1892, Chitral was governed by a strong vigorous ruler named Aman-ul-Mulk, who had a huge family which included seventeen sons. In Mohammedan countries, as a rule, no successor is named for the throne, which naturally falls to the son who can first manage to seize it and afterwards hold it. It was always anticipated, therefore, that on the death of old Aman-ul-Mulk there would be a general scramble for the throne. This is exactly what occurred. The old man died; his second son Afzul seized the fort at Chitral, killed as many of his brothers as he could lay hands on, and drove Nizam, the eldest, out of the country. This latter prince fled to Gilgit, and his fortunes seemed at the lowest ebb. Suddenly, however, like a bolt from the blue, appeared an uncle, named Sher Afzul, from Afghan territory. As I have already mentioned, he surprised Afzul in the fort at Chitral, killed him and one or two of his brothers, and seized the throne. Then came Nizam's chance. He started off from Gilgit with the support of Colonel Durand, and with that was able to turn out Sher Afzul, who fled to Kabul. Nizam-ul-Mulk reigned for a little over two years, and then, on the first day of the present year, was murdered by his brother, Amir-ul-Mulk. Now Sher Afzul has appeared on the scene again, and a Pathan chief from the south as well, and all is chaos once more.

You will have found it hard to follow me through this series of tragic events, but you will at any rate have gathered that the succession to the throne in these wild countries is a matter not easily settled. At the end of 1892, it appeared, however, to be settled for the moment, and Mr. Robertson, so well known for his adventurous journeys in Kafiristan and for the part he took in the little Hunza-Nagar campaign, was sent on a mission to Chitral with three other officers, of whom I was one. We had to march the 220 miles from Gilgit in the month of January, through constant snowstorms, and to cross a pass 12,400 feet high in the heart of winter. We and our escort of 50 Sikhs arrived, however, without any mishap at Chitral by the end of the month. The people were still panting after the excitements they had been going through, but, as they saw the British mission quietly settling down, they gradually calmed; those who had fled across the frontier or up into the mountains returned to their homes, and in a week or two everything was going on as sleepily and lazily as ever.

Mr. Robertson, whose knowledge of the people, gained from his former visits to the country, had contributed so much to this pacifying effect, returned to Gilgit in May, 1893, and I was left, with the escort of fifty Sikhs under Lieutenant Gurdon, to remain by the side of the prince, who was now acknowledged as the rightful Mehtar of Chitral. The task I had before me was a congenial one. Nizam-ul-Mulk I found to be an intelligent, sociable man, and we rapidly formed an attachment for one another. One could not help feeling that he was a weak and timid prince in many ways. But all his faults were open and well known, and, setting aside these, I found in Nizam-ul-Mulk a man devoted to hawking, shooting, and sport of every kind; a first-rate polo-player; and a man who took a keen and intelligent interest in matters beyond the ordinary run of life in his own country. He had plenty of native ability, and, though unable either to read or write, was well up in everything that concerned his country, and in the character and history of every man, above the very lowest, in it. As he gained confidence, he was able to rule his people well; and he had that natural dignity, so common, indeed, in Orientals, which helped him to fulfil all the ceremonial part of his office with eminent success.

I soon began to see how fortunate I was to have such a pleasant-mannered, amenable prince to deal with, and during the long lonely months in Chitral I got to look forward to his almost daily visits to me as one of the chief cheering events in my life there. He would talk away on every imaginable subject, from the manufacture of soda-water to the meaning of a New Testament a missionary had sent him, or the status of Dr. Leitner. I used to show him all the illustrated papers I would receive, and books with pictures, and these used to go the round of his following as well. Often there would be a long general discussion upon some point which had interested them, and I found many of these men could speak extremely forcibly and well. The occasions, however, when the orators were seen at their best were when we had to discuss some important political question. Then, in

CHITRAL BRIDGE AND TIRACH MIR.
(From a Photograph taken during the Expedition of Colonel Lockhart.)

a perfectly natural manner, without any of that idea of "making a speech," one or other of the leading men of the country would proceed to give the durbar his view of the case. With eloquent gesticulation, and with great expression and flow of language, he would put it forward in a distinct and very forcible manner, which often much impressed me, and which would have done credit to our own House of Commons. I wish I could convey to you some idea of a durbar in Chitral, held in the open, under the shade of some huge plane-tree, with the Mehtar and myself seated on chairs; the principal men sitting on the ground in a semicircle before us; behind them the crowds of attendants and the ever-watchful guards of the Mehtar; and, in the background of all, the great mountain and snowy peaks above.

The Mehtar holds a durbar twice daily, once at about eleven in the morning, and again at about ten at night. At these durbars all the affairs of the country, from the smallest to the highest, and all the gup and scandal too, are discussed. One man comes in, goes up to the Mehtar, seizes his hand and kisses it, and proceeds to lay forth his case about some land. The Mehtar, after having probably put him off once or twice, hears his case, consults some of the men in durbar of the village he belongs to, and decides the case then and there. Another man rushes in, kisses the Mehtar's feet, and says he has killed his wife whom he had caught in adultery with another man. "Very well," says the Mehtar; "go away, and don't come back till you have killed the man too." It is considered in Chitral to save subsequent feuds if both parties in an adultery case are killed, and the matter once for all settled in this summary way.

Of course I was not myself present at these ordinary durbars of the Mehtar's, but I was interested in hearing what went on, to gain an idea of the system of government in the country. This system is an especially interesting one, and in theory, and to a certain extent in practice also, a very good one. Once during the year every leading man in the country is expected to come to Chitral to pay his respects to the Mehtar, and to remain in attendance on him for a couple of months or so. He has to attend these daily durbars and help the Mehtar with advice about the affairs of the state. He receives food from the Mehtar—the meals, by-the-by, are eaten during the durbar, and the most weighty matters decided at dinner—and he is often lodged by him also. At the end of his time the Mehtar gives him leave to return to his home, and presents him with a silk robe or some other sign of favour. Certain numbers of the lower classes have also to come to Chitral to serve the Mehtar or form his guard for two or three months. In this manner there is a constant ebb and flow from the provinces to the capital; the provincial people get to know what is going on at head-quarters, and the Mehtar to become acquainted with those he rules. As a matter of fact, Nizam-ul-Mulk knew nearly every man in the country. As the eldest son of his father, he had sat in durbar all his life, and so had had ample opportunities for doing so.

In an informal manner, these men have, too, a considerable voice in the government of the country. Whenever a question is raised, the Mehtar refers it to the durbar. "What would it be best to do?" he would say to those about him; and a discussion would follow, the Mehtar would hear all that had to be said, and would then decide for himself what he would do. The more confidential matters were discussed by the Mehtar with his leading men in private audience. But in any case I do not think he ever acted without consulting some of his chiefs, and so, though he was in some ways an autocrat of the most pronounced type, and had the power of giving away his subjects and their lands and houses entirely at his own will and pleasure, yet practically these subjects had a very large share in the government of the country, and the Mehtar had to conform very largely to the customs and will of his people.

CHITRAL FORT, FROM SOUTH BANK OF RIVER.
(From a Photograph taken during the Expedition of Colonel Lockhart.)

Of these people I perhaps saw most during a tour which Nizam-ul-Mulk and I made together in the autumn of 1893, right up to the northern frontier of his country. We rode together nearly the whole day long, followed by a hundred or more of his headmen and followers, and were met at every village by crowds of the people. Even after dark the Mehtar and one or two of his brothers and a few chief men who enjoyed his favour would come to my tent and often sit up to midnight talking with me. On the march much of the formality of the capital wore off, and out hawking by the way; around the big bonfire at night or crossing a pass in the midst of a snowstorm, one could observe these hundreds of men as they really were, and mark all their traits and characteristics as they came out one by one. They are remarkably like children, these Chitralis, impulsive, gay, careless, easily roused and easily soothed, warm-hearted, I think, and certainly fond of their children; a people whom you would not care for at first sight, as they are, like all other children, shy and timid with strangers, but who, as you get to know them and they you, develop many likeable qualities. They are capable of becoming very warmly attached to British officers, and General Lockhart is a god among them. How he appears to have gained their hearts was by making jokes. They love a joke. It need not be a very deep one, but such as it is it will be received with shouts of laughter, and repeated for years after. The Chitralis are fond, too, of sport of all kinds; shooting and hawking are practised by every man who has or can borrow a gun or hawk. And they play polo with great dash and spirit, old men as well as young. I have seen an old fellow of sixty galloping about and shouting as hard as any of them. The bad points of the Chitralis are the same as those of children, the principal one being their avarice and covetousness. They are always wanting presents, and the more they are given—and they have been given a good many—the more they want. This is a very pronounced and certainly irritating defect in their character. If a present is given to one man, his neighbour wants to know why he too has not received one; and if presents of precisely equal value are not given to men of equal rank, endless jealousy and trouble are caused. They lack, too, the firm, fixed character of men, and are liable to be carried away by impulse in a careless, thoughtless way which may often cause difficulty in dealing with them. Still, with all their faults they are a people one likes to live amongst, and I hope for many years to come they may be allowed to remain in the simple independent state in which I knew them, and which they have maintained for so many centuries in the past.

I have spoken much of the people, but little so far of their country. I once, with Lieutenant Bruce, the companion of Mr. Conway, ascended a peak overhanging Chitral, and it was from the summit of that I obtained the best idea of what the country really is. It is just a sea of mountains, practically bare except in the lower part of Chitral, and it is only in small patches at the very bottom of the narrow valleys that any cultivation at all is to be found. All the remainder is bare brown rock, only relieved by the snowy peaks. Of these the great mass of Tirich Mir, 25,000 feet, is by far the most important. It is visible from Chitral itself, and though it cannot approach in grandeur to the Rakapushi of Hunza, it forms a lovely object as it is seen across the cultivated lands and orchards of Chitral, forming the snowy background to ridge after ridge along the valley. Except for these snowy peaks, however, the mountains are bare, and the greater part of the valley bottom is so also. But the villages are wonderfully beautiful. At the end of a dreary ride by unadorned rock, the traveller suddenly finds himself amongst green fields and shady orchards, with smooth fresh turf under the shadow of the mulberry, walnut, apricot, or plane-trees with which the villages abound. A Chitrali has a very good idea of the pleasing in outdoor life. The interior of his house is dull and cold, but his garden is always charming, and he loves to tend his smooth green patches of turf, and lie under the shade of his fruit-trees. These village lands are not, however, very extensive. Chitral, the largest, is only about 3 miles in length and 1 mile broad, while most of the villages are not over a mile. The country is, therefore, but a poor one in reality, and a bird's-eye view of it would show that only a very small fraction of it was cultivated. Yet this is the country which will every year become of more and more importance in our Imperial affairs, and it is the very fact of its sterility and inaccessibility which has caused so much interest to attach itself to it. The rich accessible countries of Asia have been overrun again and again; but round these secluded little mountain states of the Hindu Kush, the tides of conquest have surged without disturbing them. And hence their interest; and, though I have this evening been able to give you only a short and imperfect account of these regions, I hope that I shall have said enough to attract you to these primitive people and the rugged mountains amongst which they dwell.

Before the reading of the paper, the PRESIDENT said: There is no occasion for me to introduce to you such a very old friend as Captain Younghusband, from whom we have already received two most interesting communications. I will, therefore, merely call upon him to read his paper.

After the reading of the paper, the following discussion took place:—

General Lord ROBERTS: Captain Younghusband has given us a very graphic account of a part of the world which has been hitherto almost a *terra incognita*, but that unknown country must now become of intense interest to some people in England, from the fact that it has been found necessary to organize a force for despatch to Chitral, for the purpose of expelling Umra Khan from a place with which he has no right to interfere, and of rescuing the British Agent, Mr. Robertson, and his companions. These officers, with some three hundred native soldiers, are reported to be surrounded in the fort of Chitral by this same Umra Khan, the chief of Dir, a petty state situated about midway between Peshawur and Chitral. Captain Younghusband has told us how precarious is life and how uncertain is succession in these out-of-the-way Mohammedan states, and he has also told us how his friend Afzul-ul-Mulk was treacherously murdered by one of his own brothers on January 1 of this year. Previous to the murder the fratricide had made friends with Umra Khan, and it is probable that the murder was arranged between these two worthies. At any rate, as soon as it had been committed Umra Khan appeared upon the scene. Meanwhile Mr. Robertson had moved to Chitral to support his assistant, Lieutenant Gurdon, and watch over affairs in the interests of the British Government. Shortly after his arrival there, he had to take refuge in the forts, as the force accompanying him was not strong enough to cope with that which Umra Khan brought against it. Umra Khan was warned by the Viceroy of India that he could not be allowed to remain in Chitral, and that, unless a satisfactory reply was received from him within a certain date, an expedition would be sent to enforce obedience to the demands of the Indian Government. The serious events which have been reported within the last few days make the despatch of this force now a certainty, and we must all hope that it will reach its destination in time to preserve the lives of Mr. Robertson and those with him. The necessity for the expedition is much to be regretted, but one great advantage to be derived from it will open out of the direct route between India and Chitral, a place of great strategic importance in the scheme of our frontier defence. The distance from the Peshawur valley to Chitral by this route *viâ* Swat and Dir is about 200 miles, whereas the route through Kashmir and Gilgit, by which all troops and stores have now to travel, is more than 600 miles in length, and is closed by snow for nearly six months every year. Swat, through which the expedition must pass, is a district we have hitherto carefully avoided, as it is certainly inhabited by a very fanatical race of Mohammedans, and its physical obstacles are said to be even greater than those of other parts of the mountain ranges along which our trans-Indus frontier runs. But I feel confident that neither the one nor the other of these difficulties will prove unsurmountable to the well-equipped and well-organized force which Sir Robert Low will have under his command. Even if the difficulties should prove to be as great as they are reported, they must be overcome, for we cannot allow our officers and the gallant native soldiers with them to be sacrificed without making every effort to save them, and it is out of the question our continuing to occupy Gilgit and Chitral without having a route by which we can communicate with these places rapidly and at all seasons of the year. We have now got control over nearly the whole of the frontier south of the Kabul river, a task which was believed to be most dangerous, if not quite impossible. But the late Sir Robert Sandeman showed that, by discontinuing futile blockades and inconclusive reprisals, and by taking the tribesmen into our confidence, roads—those best of all civilizers—could be made, and the wild border tribes themselves turned from enemies into friends without scarcely firing a shot. With the exception of the Umbeyla expedition in 1863, British troops have never entered the hills north of the Kabul river, so that a special interest attaches to the expedition which General Sir Robert Low has been selected to command. Some may wonder why such stress is laid upon British influence being extended over tribes with whose religion and domestic arrangements we have no intention to interfere, and whose territories we have no desire to annex. Others, again, may think that they ought to be left to themselves, to murder and plunder to their hearts' content, as they have done for generations past, so long as they don't trouble us. The reason why it is advisable for us to try and gain an influence for good over the border tribes (looking at the question from merely a selfish point of view) is that they are a great factor in the defence of the north-west frontier of India. They number more than 200,000 fighting men, and our frontier is conterminous with theirs for some 1100 miles. Thanks to the enlightenment of the present ruler of Afghanistan, our relations with that country are becoming more satisfactory than they have ever as yet been, but it is just as essential we should be on satisfactory terms with the warlike tribes inhabiting the mountainous district between Afghanistan and India. We cannot leave them to themselves until the time arrives when we shall need their assistance, or at all events their neutrality. Before that time comes they should have learned to look upon us as their friends, and to appreciate the benefits which civilized intercourse with us will confer upon them. Moreover, we must be able to pass through their territories, and make roads to those points which we shall have to occupy in the event of India being threatened by a foreign power.

The Hon. G. N. CURZON, M.P.: I am very glad indeed that Lord Roberts has spoken out with such very great clearness and force, and with the exceptional authority which he may be said almost alone to possess, upon the important question now raised upon our frontier. I of course shall not intrude upon that sphere, with which I have no right to deal; but inasmuch as, in the course of last autumn, I covered nearly every yard of the country which the lecturer has spoken of, for the most part in the agreeable company of himself, I may perhaps be allowed to say a word upon the larger question. Captain Younghusband has been unduly but characteristically modest in his description of the part he has played in these countries, which has been very considerable. In the first place, years ago, before we knew much about them, by his intrepid explorations, he first placed at the disposal of the Indian Government the essential and invaluable information upon which, when military operations were found to be necessary, they were glad to act; and his services have since been equally useful in the task of administration. From my own experience, I can say that Captain Younghusband is eminently gifted to win and to retain the confidence of the native peoples and their chiefs with whom he is brought into contact. A few weeks ago, when I read a paper here, I terminated my remarks at a point where, having crossed the Baroghil pass, I reached the head-waters of the Yarkhun river, which is subsequently known as the Kashkar, Chitral, or Kunar river, and which flows down by Mastuj to Chitral and Jellalabad. For three days I followed down the course of that river, through a gorge of great depth and corresponding grandeur. I remember on the first day of my journey, in the beginning of October, I had to ford the river no less than twelve times, and passed six glaciers. This valley is characteristic of all the Chitral valleys, which sometimes narrow down to a defile through which the river plunges, sometimes open out into a wider river-bed with jungle on either side. Captain Younghusband mentioned to-night the amiable and sporting proclivities of the Chitral people; and I shall never forget a picture that is imprinted on the retina of my memory, viz. the sight of the old governor of the Yarkhun valley, who rode with me for two days—a gallant old gentleman of some sixty or more years of age, with a magnificent beard stained a rich red, and enormous moustachios that protruded for several inches on either side of his face, his head wrapped round with a splendid gold and red turban, a velvet *chogha* or cloak on his shoulders, and his little boy sitting behind him on the saddle and clinging round his father's waist. This brave old sportsman rode hour after hour the whole day through with his hawk on his wrist, and when any quarry arose, whether quail or duck, he let fly his hawk, galloping after it to take up the bird again on to his hand.

In this way I went down to the fort of Mastuj, where I was joined by Captain Younghusband. He did not say much about that place, but I mention it for two reasons: to illustrate both the discomfort and the artistic taste of the Chitralis—the discomfort, because in order to get to my room, which was the principal one in the building, I had to crawl along a low tunnel and climb a rickety ladder, though this was in a royal residence; on the other hand, the artistic taste, because the woodwork of the room was most elegantly carved. From Mastuj we continued down the river by the route which has been described this evening, and I well remember the spot where Captain Ross and his men have been killed. Not that it differs much from any other spot, for the landscape characteristics are uniform, and no great variety occurs in any 10 or 20 miles; but just at that stage Captain Younghusband will remember that he mounted me on a horse which had been presented to him by the Mehtar. Whether it was owing to my weight or to the severity of the ground, this unhappy animal gave out in the course of the march, and took to spitting blood, so I had to dismount and lead him into Reshun, where he died in the course of the night. That will indicate the steepness and stiffness of the ground, which aggravated the unfortunate disaster to our troops.

One word about the late Mehtar. Words cannot express my sorrow at the lamentable death of that poor man. I quite concur in what Captain Younghusband said about him to-night. He was a man not, perhaps, highly endowed with strength or resolution of character, but differing from the rest of his people in having some conception of mercy. Abandoning the immemorable usage of his family of killing every one of his brothers, he gave a safe conduct to the younger brother, who has now killed him. He also pardoned an old gentleman who plotted against his life, the old fellow of whom Captain Younghusband talked in his paper as playing polo. His sole revenge was to make him captain of the opposite team to himself, which was always sure to be beaten. It is a melancholy thing that this young prince, amiable in character and absolutely loyal, should have been killed.

Captain Younghusband has talked about the good manners of the Chitralis. They are also capable of sustaining a serious conversation. He will remember the morning I spent there, in which for the best part of three hours the Mehtar and his leading men came and laid before me the affairs of their state; and certainly, when we bear in mind the necessary ignorance as well as the remoteness of these tribes, it was remarkable to hear them state their case and conduct a conversation with as much dignity and good sense as these men did.

Colonel H. C. B. Tanner: The most prominent peaks of the Hindu Kush were observed and trigonometrically fixed by myself from points in Gilgit averaging from 17,000 to 17,400 feet in altitude, but sufficient suitable stations were not available in the small tract of country I was allowed to visit for fixing all the most lofty mountains seen. That slide with very dark clouds and white snow represents a peak the position of which is unfixed, having been observed from one point only. I wrote to Dr. Robertson about it, but unfortunately he is so far away that I have received no reply. It seemed to me to be on the continuation westward of the Hindu Kush range in the direction of Kaffiristan, and in the neighbourhood of Tirach Mir. I should say it must be over 24,000 feet high, and sufficient to give rise to very large glaciers.* Dr. Robertson had no means at his disposal of fixing with accuracy the highest mountain ranges in Chitral and in Kaffiristan, but when the cloud has blown over and our forces have visited Chitral, no doubt surveyors will follow, and by-and-by all the undefined part of the map now before you will be cleared up. It is for the Geographical Society to continue their efforts to see that accounts of these interesting tracts are brought to us. The vast numbers of languages spoken there render the country one of the most interesting in the world, and although Dr. Robertson has done a great deal, and Captain Younghusband is still at work, it will be very many years before we have cleared up all the more interesting points yet to be determined. I trust, therefore, that our interest in the country round Chitral and Kaffiristan may not cease because a few explorers have already been there.

The President: It is so short a time since Mr. Robertson charmed an audience in this hall by his most interesting account of his sojourn in Kafiristan, and we were all so much interested in what he said, that we cannot but feel very anxious now that he is in danger, or that, at least, he is in a state of isolation. We must all, therefore, have listened with deep interest to what Lord Roberts has told us of the march by the Swat valley from Peshawur to Chitral, which, I believe, is only 186 miles, and two-thirds shorter than the route usually taken. Perhaps it is not too late this evening to ask General Walker if he will give us some account of what he knows in a little more detail of that route from Peshawur to Chitral.

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* Tirach Mir, seen first by Colonel J. Biddulph, is 25,400 feet high; two other points to the eastward, and on the main ridge of the Hindu Kush, are over 24,000 feet. The unfixed peak of Colonel Tanner may probably be near the Doráha or Nuksán passes.

General J. T. Walker: I am very sorry I can give but little information. It is thirty years since I was employed on the frontier of Peshawur, and it is to be hoped that our officers there know a little more of the regions beyond now than they did in my days. I sincerely hope that Lord Roberts is correct in his anticipation that our army will be able to march from Peshawur to Chitral; but it is a very difficult country to traverse. I am not aware that any Europeans but one, Mr. McNair, an officer of the Survey, has been through it. It is a country without roads and with various difficult passes, and I am afraid that General Low has a very arduous task before him; but I can only hope that he will be successful, and will not only relieve Dr. Robertson, but that we shall be able to acquire permanent influence over the whole of the intermediate country. This will be certainly an enormous advantage in the management of affairs up in Chitral, as it will open out the direct route to that country, which is so much shorter than the route which has at present to be taken.

The President: I remember, when Captain Younghusband read his first paper in this hall in the year 1888, that Sir Henry Rawlinson, our lamented president, joined in the discussion, and he said that the name of Younghusband would always be in the first rank amongst explorers who had found their way over the great plateau of Central Asia. Since that time our gold medallist has worked hard in the same geographical field, and has explored the northern side of the Karakoram range and the Pamirs, and, as we have heard to-night, Chitral and Hunza. He has already communicated to us three papers, and the present one, like the two former papers, is valuable from a geographical point of view, is charmingly written, and most interesting. When I propose a vote of thanks to Captain Younghusband, I feel sure that I shall carry it with acclamation. And we must not forget to thank Colonel Tanner, who has contributed so much to the interest of the evening by his pictures.

Note on Map of Chitral.—In the map to illustrate Captain Younghusband's paper on Chitral and the adjacent countries, the part north of lat. 35° 30′ N. has been taken from the "Map of the Pamirs," compiled at the Intelligence Division of the War Office. The part south of this parallel has been taken from the "Map of Afghanistan," published by the Indian Survey Department, with additions furnished by Captain Younghusband.

THREE YEARS' TRAVEL IN THE CONGO FREE STATE.*

By S. L. HINDE, Captain in the Belgian Service.

Having been appointed to the Congo Medical Service, I landed at Boma in December, 1891, and went up to Stanley Pool. Thence I was sent to the district of Lualaba, commanded by the Baron Dhanis, and on arriving was immediately ordered to join an exploring expedition to Katanga.

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* Paper read at the Royal Geographical Society, March 11, 1895. Map, p. 512.

Our force consisted of 350 regulars, one Krupp gun, and porters. While on the road to Katanga, information reached us which sent us full speed to the Lomami to stop a raid of Arab slavers. It turned out that the raid was nothing less than the advanced guard of an invasion in force, aimed at the overthrow of the Congo Free State and the obliteration of the white man's influence in Central Africa. So it came about that for two years from this time, I acted as combatant officer in a war between the state and the federation of Arab slave-traders on the upper Congo and its tributaries, who, since the overthrow of the Falls Station in 1886, had established a power which was to all intents and purposes an independent rival of the Free State, although not so indicated on our maps.

Towards the close of the campaign I received orders to survey the Lualaba and Lukuga from the neighbourhood of Kasongo upwards. The United States commercial agent, Mr. Mohun, obtained leave to accompany me. This mission was successfully accomplished as far as M'Bulli's on March 6, 1894. It will be remembered that the river below Kasongo had been explored by Stanley and by others since his time, and that the Lukuga from Tanganyika as far as M'Bulli's had been made known by Thomson and Delcommune. My work, therefore, was to connect the surveys of Thomson and Delcommune with those of Stanley and his successors.

The journey up the river from the coast by Leopoldville to the station of Lusambo on the Sankuru has been frequently described. The path from Matadi up to Stanley Pool is now so far a made road that there are bridges over most of the rivers, and the pathway is cleared of trees and all large obstructions. Shelters have been built at intervals of three hours over the whole distance. The porters employed for the carriage of goods belong to the Manyanga and kindred tribes. There is a marked difference between these people and the carriers used by the Arabs in the Manyema district. The latter are slaves, forced to work, but fed on a sufficient meat diet. The former are free men, but indifferently nourished. The Manyemas are able to carry 80 or 90 lbs. without much difficulty, while the Manyangas are rarely up to a burden of more than 60 lbs.

Leopoldville, on Stanley Pool, I found very short of food. I have since heard that this was due to the chief Galyema, with whom Stanley made the agreement permitting the state to establish the station. About a year and a half ago the commissary of the district drove him into the French territory, and since that time there has been no difficulty, unless it be the prevalence of high prices, in the feeding of the garrison at Stanley Pool. Sickness is at all times very rife at the Pool, and is due partly to the inexperience of the new arrivals from Europe on their way up country, and partly to the carelessness of the time-expired whites, who, coming down from the interior at certain seasons, fail to clothe themselves sufficiently, and overdrink and over-eat whilst waiting for their caravans to be made up. I may mention that while I was at Stanley Pool there were one or two disturbances in the neighbourhood. I was lucky enough to be appointed to the expedition which quieted them. The officers of the district were very much surprised at the richness of the country within two or three days' march of their station. The fact is that the transport service is so large and so undermanned that the commissary of the district of Stanley Pool has never had time to learn his own district.

After three months spent in the district of Stanley Pool, I got my instructions to proceed to the district of Lualaba on the Sankuru. I left Stanley Pool in the *Stanley*, with 500 soldiers and porters. After four days' steaming we reached the mouth of the Kasai, up which we turned. We were now in the land of plenty. Goats could be bought for a handful of blue beads, or for cloth or handkerchiefs, *if blue.* Wood for the steamer was difficult to obtain, the edge of the forest being usually a mile or so from the river-bank. Sometimes we steamed a whole day without being able to replenish our stock. The marshes and grassy plains along the river border, and the sandbanks and islands in its course, literally teemed with game. There were vast flocks of egrets, pelicans, geese, and many other species. On one occasion we counted 230 hippopotami in a line, looking like a ridge of black rocks. The Kasai natives seem to be dangerous. We had several fights with them on account of their stealing the men's axes or attacking the wood-cutters during the night. On several occasions when we were passing close to the land, at points where the scrub on the banks was sufficiently thick to hide them, the natives fired into the steamer with arrows and muskets, apparently from pure love of mischief; for, at the time of which I am speaking, there had not been enough traffic on the river for steamers to have given general cause of quarrel.

The crew of the steamer consisted mainly of Bangalas, of whom Ward has written much in his 'Five years among the Congo Cannibals.' They dress their hair fantastically, allowing one or more pigtails to grow a foot long, and stiffening the plaits with wax, making them stand up, and look like horns; they also cut and recut the skin from the root of the nose upwards to the hair, the cicatrix thus formed being often an inch high, and resembles a cock's comb. Their behaviour on the steamers is splendid. They are at once hunters, soldiers, and sailors, but cannibals. When the steamer approached the bank with the intention of mooring, two or three of them would tumble overboard, hanging on to the flukes of the anchor, run along the bottom in 3 or 4 fathoms of water, and, coming up at the bank, hook the anchor into the root of a tree. After twenty-two days' steaming, we arrived at

Benabendi. This is the Belgian Commercial Company's station, where the Sankuru joins the Kasai. Three years ago this was the only station on the Kasai. At the present minute, I believe, there are fourteen belonging to different companies. We now turned from the racing Kasai to the placid Sankuru, whose banks, in marked contrast to those of the Kasai, are clothed with forest to the water's edge. At the time when we went up the Sankuru there were no stations upon it. There are now twelve engaged in the collection of enormous quantities of indiarubber. It seems to me there is a variety of hippopotamus in the Congo basin which does not grow larger than an Alderney cow, and yet the adults are much larger than the dwarf hippopotami, of which there is a specimen in the British Museum. Unfortunately, I have not a specimen to show. In the Sankuru I saw a herd of twenty-three, and in the Lualaba below Riba Riba, a herd of eighteen small hippopotami.

The Sankuru water-people, called Bakuba, are not nomadic; they are a fine race of traders and farmers. Their houses, about 20 feet high, are well built, beehive-shape, thatched with grass to the ground. They make a very good kind of canoe, flat-bottomed, the sides about 10 inches high, tapering to a point fore and aft. Their paddles are about 9 feet long, and well made; many of their paddles have a small knob at the upper end, which is held in the hand. While paddling they chant and take a step forward as they catch the beginning of the stroke, and draw the foot back as they pull through. Ten or twenty of them paddle the ordinary canoe, and keep the most perfect time. The women wear cowries in their hair, which they also plaster with reddish paint and grease. The men and women wear a strip of palm-fibre cloth from the waist to the knees.

Ten days more of steaming took us to Lusambo, the capital of the Lualaba district, situated, according to Lemarinel, in 23° east longitude, latitude 4° south. The station is built on a sandy plain on the right bank of the Sankuru, opposite the mouth of the Lubi, and was founded to check the Arab advance from the east. It consisted of a garrison of 13 white men and 400 black soldiers. There having been little fighting, the whole station had been occupied for two years in making large plantations of cassava, maize, and rice, which were in splendid condition, the station being self-supporting. Here I reported myself to the Commandant Dhanis, who had just returned to the station after having defeated the Arab slave-raider, Gongo Lutete. The *Stanley* had brought up orders for the despatch of an exploring expedition to Katanga, and I was at once directed by the commandant to join the caravan, which consisted of seven officers (white men), 300 soldiers, and 200 porters, besides camp-followers and women. The commandant himself took command. Each of the seven officers had three trained bulls to ride, which eventually served for food on the road.

We started on July 17 for Pania Mutumba's village, three days' march from Lusambo. Crossing the Sankuru, we marched up its left bank through an extensive forest, in every part of which were wild coffee, indiarubber, and elephants. Pania Mutumba is a very rich village of about 3000 inhabitants, well built in straight lines. The huts are square, but have roofs of the ordinary beehive shape. They are larger than usual, being 30 or 40 feet high, and 15 feet square on the ground. Crossing the Sankuru, we marched for five days south-eastwards to Mona Kialo's, finding practically no food on the road. The vacancy of this district, devoid alike of men and food, had been created by slave-raiders in Tippoo Tib's employ. Every height was covered with splendid palm plantations, and with the remains of villages, whose precise extent was indicated by the bomas or palisade fortifications, which had taken root and grown into ring fences.

Two or three hours beyond Mona Kialo's to the eastward, we came on two villages in clearings, freshly constructed, and inhabited by Batwas or pigmies from the surrounding forest. In reply to a call from the guide Mona Kialo had given us, about 100 of the dwarfs, men and women, came round us. Their average height was about 3 feet 9 inches. I am not sure that the existence of the pigmies in this district has been previously mentioned. On this occasion our little friends were uninterestingly peaceful, but at a later time we learned to know them in other moods. It is a curious fact that they are not afraid of fire-arms; they drop when they see the flash, then run in and spear or shoot their opponent with arrows, before he has time to reload.

Our caravan did not suffer from hunger, for Commandant Dhanis had allowed every man to take at least one woman and a boy with him as transport and commissariat. Immediately beyond the last dwarf village we came to the Lubefu, an extremely rapid stream 200 yards wide, which it took the caravan two days to cross. The water was at this time red, a small tributary higher up, which flows through red clay, being in flood. At this point ambassadors came to us from Gongo Lutete, with a message that, as he wished for peace, he would like the white man to come and visit him. Commandant Dhanis decided to do so, although at a cost of a long deviation north-north-east from the direct road to Katanga. After four days, we were met by a large present of food from Gongo Lutete, and halted at Mulenda's, on the Ludi. His town had a splendid boma, made of trees 30 feet high, most of them garnished with human skulls in various stages of decay. Having recruited our caravan with a couple of days' rest, we went on three days further to Gongo's capital, N'Gandu.

Among the hills, about four hours' march from Mulenda, on the Ludi, we found a small circular lake of about a mile in diameter. This lake is supposed by the natives to be haunted. They say that it is dangerous to sleep near it, drink of it, or bathe in it. Thanks to this superstition, it is inhabited by two of the largest solitary bull-hippopotami I have ever seen. The water of the lake is perfectly pure. On a subsequent occasion, many of our people drank of it and bathed in it for a couple of days without any ill effects. N'Gandu was a fortified town by the river-bank, with four gates, each approached by a very handsome pavement of human skulls, the bregma being the only part showing above ground. I counted more than 2000 skulls in the pavement of one gate alone. Almost every tree forming the boma was crowned with a human skull. Gongo Lutete had himself been a slave, but was now become one of the chief slave-raiders. He had gathered together about ten thousand cannibal brigands, mostly of the Batetela race.

Through the whole of the Batetela country, extending from the Lubefu to the Luiki, and from the Lurimbi northwards for some five days' march, one sees neither grey hairs, nor halt, nor blind. Even parents are eaten by their children on the first sign of approaching decrepitude. It is easy to understand that under the circumstances the Batetela have the appearance of a splendid race. These cannibals do not, as a rule, file their front teeth, nor do they tattoo the face. I explored the Lomami for some six or eight hours above N'Gandu. The river is about 200 yards wide, rapid in many places and rocky, and navigation even in a canoe is very difficult. Northwards, eastwards, and southwards of N'Gandu extends a vast palm forest, containing great patches of indiarubber creepers.

We were regally entertained for a month at N'Gandu, at the end of which period Gongo Lutete said that he would leave the Arabs and come over to the white man if we would keep faith with him, and, in proof of his own fidelity, he gave us a large present of ivory. He then told us that the Arabs had massacred Hodister's expedition and the white Pasha from the East, whom we guessed to be Emin. He added that they had also succeeded in killing Stairs and Delcommune, but this was, of course, incorrect. Leaving a post with two officers at N'Gandu, we resumed our march towards Katanga, following the ridge of the watershed between the Lomami and the Lubefu. We passed the Two Mountains, seen from a distance by Wissmann. Seen from a point a mile away, it is almost impossible to believe that one of them is not a castle built by human hands, the vast square blocks of grey rock having all the look of old masonry. During this march we came across hundreds of human skeletons—according to our Batetela guides, the victims of a small-pox epidemic. But there were bullet-holes in the skulls, and the epidemic had probably been a Batetela slave-raid. After six days' march we arrived at Kabinda, Lupungu's capital. At this point Dhanis was obliged to return to Lusambo.

Lupungu is the great chief of the Balubas, with an influence extending to the Lulua, and southwards to the Katanga. The Balubas in this district are olive-coloured, with thin lips, and, even from a European point of view, are good looking. The Balubas, who all file the upper and lower incisors, were not cannibals a short time ago, but of late years the men have learned to eat the enemies who fall in battle; as yet the women have not taken to this revolting practice. Kabinda is in 6° south, and 24° 35′ east. It is built on a hill. The chief industry is the making native cloth out of palm fibre. Pieces of this cloth, about 18 inches square, called Madebas, serve as money at Kosongo, on the Lualaba, where there are no palms. Iron is also a source of riches to these people; some of their work is beautiful, particularly the axes and arrowheads. We hunted and shot in this neighbourhood, and found that the Lukassi, a tributary of the Lomami, discovered by Wissmann, rises in a lake about 12 miles south of Kabinda. This lake is very full of hippopotami, though only about 2 miles square.

Food being scarce at Kabinda, Lieut. Scaerling and I led the men along the course of the Lurimbi eastwards to Kolomomi's. Here we received a letter from Captain Lippens, the Belgian resident at Kosongo, confirming the report of the murder of Emin Pasha and of Hodister, saying that he and his assistant, Debruyn, were captives, and that Sefu (Tippoo Tib's son), although holding a commission from the king of the Belgians as commissary of the district, was marching to murder us with 15,000 guns. We at once decided to try and stop Sefu crossing the Lomami, and by forced marches arrived at Goimuyasso's, on the Lomami, having heard that it was there that he was going to cross. The Lomami at this point is 200 yards wide, and very rapid. The canoes in use here are simply hollow logs, and are pushed with a pole, the natives on the Lomami not having learnt the art of paddling. We kept Sefu in check for six weeks, until the commandant arrived with reinforcements. Curiously enough, the very day after his arrival we found that Sefu had crossed the Lomami twelve hours' march below us at Jigge. Here we defeated him. A panic seized the Arabs, and the whole host jumped into the river, leaving about 600 dead on the field of battle, and some 1500 more were drowned. The whole country rose in our favour; Kolomoni and Lupungu joined us with 2000 guns and 5000 bowmen and spearmen, and followed the Arabs across the Lomami. At the same time the commandant sent a column from N'Gandu to accompany Gongo Lutete, and join us at Lusuna. We marched for three weeks over the tableland of Kabamba. This country is all swamps, and we had a nightly difficulty to find a dry place in which to pitch our tents. When we started from the Lomami we left all baggage behind, and trusted to the country to feed us. We were without anything European, and subsisted on the goats' flesh and rice which we took in some skirmishes. The Arabs had cut down all the limes, bananas, and other fruit-trees, and had devastated the country with the object of starving us out.

It is a remarkable fact that during the whole of this march through stinking swamps, when we were repeatedly immersed to the waist and the neck for hours at a time, and this at midday of the hottest season of the year, there was not a single case of fever either among blacks or whites. May this not be explained by the fact that we were away from the forest shade, and that the sun's light could play with full bactericidal power on the surface of the marsh?

Arriving at Lusuna's, a town described by Cameron, we joined forces with Captain Michaux and Gongo Lutete, who had already captured the place. Cameron's Lusuna had died about ten months beforehand. We were told that when he was buried they cut the throats of 100 men and placed them in the grave, laid the chief's body on the top of them, threw in 100 live women, filled up the hole, and built a splendid house upon it. The house was burnt with the rest of the town after Micheau's attack. Here we counted our forces. We found that Gongo Lutete had over 2000 guns with him, and Lupungu and his tribes over 3000. Our regular force consisted of 400 drilled coast-men and their women. Lupungu was afraid to advance, saying that dysentery and small-pox were rife in the Arab country, so we sent him home with all his people. Here, too, we heard that Muni Mohara, the chief of Nyangwe, was marching against us with 12,000 guns. This was an exaggeration, for when we exterminated his band, we took only about 5000 guns. News also came in that Sefu, after his defeat, had murdered his captives, Lippens and Debruyn. From Lusuna we followed Wissmann's route towards Nyangwe. At Goio Kapopa, at the junction of the Mwoida and Lufubu, we fought several battles, in the first of which Mohara was killed. We advanced to the Lualaba, and came in sight of Nyangwe on January 28, 1893.

NYANGWE.

All the country between the Lufubu and the Lualaba is salty. I examined some of the salt marshes, and in two of them found the brine coming out of the ground, warm. Sections exposed in the banks round the marshes showed slate above a kind of marl. In the centre of one marsh I found a hot sulphurous spring, with a temperature of about 120°. The natives boil the brine, and obtain a salt black with mud. We encamped for six weeks in the swamps described by Cameron on the left bank of the Lualaba, opposite to Nyangwe. The Arabs attacked us on several occasions, and we exchanged shots daily across the river. At this time we were living in the swamps and drinking the swamp waters, but did not suffer from fever. During the whole war we were in constant communication with the enemy, and even with natives of the district whom we never saw, by means of the drum telegraph. We had no difficulty at night in talking to the friendly natives 5 and 6 miles off. There seems to be a fairly well-known general code, though each tribe, and often each chief, has a special code. On several occasions our chiefs signalled to some of their own people, at the time Arab prisoners or wives, telling them when and where to desert to us, which they did successfully.

On February 26 the Arabs attacked us in force, and were defeated. This had such an effect on the Waginia, the river people, that they came and offered us their canoes to attack Nyangwe. With one hundred dugout canoes, we took Lyangwe on March 4. It was a finely built Arab town of about 25,000 or 30,000 inhabitants. We there found papers and clothing which had belonged to Emin Pasha. He had been killed at Kibungi, on or about October 23, 1892. It is worthy of note as proving a premeditated scheme, that the details of his death, with the names of the chiefs who killed him, had been reported at Zanzibar in June, 1892.

The third day after the taking of Nyangwe, the Arab soldiers and allied chiefs came in in great numbers, offering submission, voluntarily surrendering their guns, and saying that the Arab power was ended. We gave them quarters in the town, believing in their good faith; but two days afterwards we found that the whole town was filled with armed men. For every gun which had been given up, a dozen had been brought in by night and hidden. The plan, as we afterwards learned, was that Said-ben-a-Bedi, the chief who conducted Emin from Lado to his death, should camp at two hours' distance from Nyangwe with his army, with the object of supporting those in the town who had made apparent submission, when they should fire the place and attack us. By some lucky chance the attack was made at midday, and not at midnight as had been arranged, and Said-ben-a-Bedi failed to bring assistance. As a consequence the revolt was stamped out. Over 1000 men fell. Next day I had the direction of the burying-parties, but only found a few hundred heads and bones; the camp-followers, friendly and other natives had carried off all the meat, and in many cases the whole body, for food. As far as I have seen, the African cannibals never eat flesh raw; they always boil or roast it. After four hours' street fighting, Nyangwe was burnt, and now there is only one house left, which has become a state station, and around it are springing up native villages and plantations of coffee, rice, and cassava.

At Nyangwe the Arabs sent their sick people into our camp, thereby causing an epidemic of small-pox. At the same time there was raging the most virulent form of influenza that I have ever seen. During the many months' hardship preceding this, we had had no deaths with the exception of one from pneumonia, one from heart-disease, and the killed in battle. This, as I have before observed, was probably due to the fact that the men were well fed and cared for by the women who accompanied them.

WAGINIA VILLAGE.

On April 16 we were joined by the first reinforcements. On the 19th we marched on Kasongo. Our way led through a splendidly fertile and entirely cultivated country. We stormed Kasongo on April 23. Kasongo was a newer town than Nyangwe, better built, and apparently very rich. We took great numbers of repeating and other rifles, and tons of gunpowder, besides sugar, vermicelli, sardines, raisins, and other European delicacies. Kasongo seems to have had a population of about 60,000. The streets were fairly straight; there were bridges over all the brooks, and wooden conduits for the drains. The whole country round for 5 or 6 miles was one vast cultivated field. I rode through one rice-field in a nearly straight line for two hours.

Kabambare was taken on February 13, and Rumaliza, the chief of Ujiji, fled to Tanganyika, and probably across it. Thus the last hold of the slavers to the west of Tanganyika was destroyed.

On returning to Kasongo, the country now being quiet, I got instructions to try and find a road from Kasongo, by water, if possible, to Lake Tanganyika, the caravan road by Kabambare presenting so many difficulties. The United States commercial agent, Mr. Mohun, had requested to accompany me, and I had orders to assist him in any way in my power, as he wanted to get through to Zanzibar. We started on March 16, and struck the Lualaba, at Ferhagie's village on a commanding bluff, just below the first of the Kasongo rapids. Here we managed to obtain twelve canoes. We pulled up the rapids, and stopped at Luntumba's, on the left bank, the country we passed being low and rich. It had been cultivated by the Arabs. The river was very fine above the rapids, running like the tail of a mill-race for several miles. Twenty minutes above Luntumba's village we came to other rapids, through which the natives dragged our canoes. These natives were Waginia, already spoken of in connection with the taking of Nyangwe. They attached creepers to the canoes, and sixty or seventy men dragged them one by one up the rapids. In one place I calculated the fall to be about 20 feet. Several of the Waginia were carried down, but, as they swam like fish, seemed none the worse for it. These Waginia are a nomadic race; they never fight, and in fact never carry even a spear in their canoes when travelling, as they used to say themselves, "If we

FLOATING ISLAND ON THE LUALABA.

have done wrong, kill us; we are only women." As may be imagined, they are great liars and clever thieves. The Arabs had taught them to work for nothing but their food on the voyage. They build little huts about 6 feet high, with nearly flat roofs of grass or banana leaves, the walls either made of grass or wattles daubed with mud. They live by selling an inferior kind of earthen pot, which they make of river mud, also by fish-trapping. The commonest kind of trap is made like our lobster-pots. Some of them are very large; I saw one 8 feet in diameter. They do not make their own canoes, but buy them from the forest people. The rocks in this second series of rapids are dark in tint, in places nearly black, and streaked with deep red. They are very rich in iron—so much so, that all this day our compasses were of no use. In going 20 yards in a straight line, with no rock visible above the water, the needle would turn halfway round the box.

NATIVE CANOE ON THE LUALABA.

Immediately above the second rapids the Lualaba, here a mile wide, is joined on the right bank by the Lulindi. In the upper angle formed by the Lualaba and Lulindi, are fine mountains covered with forest called the mountains of Bena Twiti. We had been fighting against Rumaliza in these mountains some months beforehand. Some distance higher up, the Lualaba is joined by another tributary from the east, the Luama. Between the Luama and the Lulindi the main river describes a right angle, flowing westward to the village of Sekabudi, then northwards to the confluence of the Lulindi. We camped on the left bank of the Luama, that river at its confluence with the Lualaba being about 250 yards wide, with a very rapid current. On the right bank of the Luama the mountains of Bena Twiti seem to be about

10 miles distant. Passing two more small rivers on the right bank, the Kasima and the Kalambija, we came to the rapids of M'Toka. These rapids were formed by a whitish rock, which broke up the river into small streams. The main current was about 100 yards wide, churned into a froth, and apparently not very deep. The difficulty of seeing the banks and of following the course of the river made it impossible to say what was here its exact width; but I should think that, from the mainland on the one hand to the mainland on the other must be about 2 miles, but a great deal must depend on the season. We saw large flocks of geese and some hippopotami here. The mountains on each side of the river up to the next falls are called Simbie; they are not very high, and are thickly wooded. They commence about a mile from the river-bank on either side. After having ascended these rapids in the same way as the others, we arrived at Mutetele. The Lualaba here narrows, and just above the falls is not more than 100 yards across. From here we could see high blue mountains to the south-west, apparently about 20 miles off. One of these is now called Mount President. It was of a curious shape, something like an elephant, the head pointing eastwards. Enormous quantities of geese and duck were shot, enough to feed the whole caravan. Palm trees were fairly common, though the natives refused to give us palm wine, alleging as the excuse that it was habitually stolen by the elephants.

At the falls of Simbi the native chief, Tamwe, had a couple of hundred men ready when we arrived, to haul us up. The natives at this place were very kind, probably wanting to get rid of us. I have always noticed that the natives are generous, hard-working, and obliging, wherever they have been raided by the Arabs. Presumably, they have found that the simplest way of getting rid of visitors is to help them on their road. The Lualaba here narrowed considerably. The river-banks were thickly wooded, and there seemed to be large numbers of buffalo on the plains. The hills were only 200 to 300 feet high, and commenced about a mile from the river-side. The river itself varies from 100 to 200 yards wide, is very rapid, and has a rocky bottom. When the river is very full, it is evidently at least 400 yards in width, and deep enough to cover all the rocks. Palm trees abound, but natives are scarce, this country having often been raided in days gone by.

At the top of the rapids we got to the village of Fambusi, where there is a sort of pool. It is a pool, not a lake—a mere broad in the river. The mountains are wooded, and are covered with game. The grassy plains run for about 2 or 3 miles inland from the river-banks. The natives here are of a new race, the Waujabillio. They speak a dialect of the Batetela language. Here, at Fambusi, we saw the elephant-like Mount President, about 20 miles off to the westward. In the next three hours the river was not difficult of navigation. Then we came to fresh rapids, where I saw, for the first time, a lot of grey plover, and also large flocks of wild geese, which were very acceptable to the caravan. We slept in the villages of the Waujabillio. These villages are irregular in plan, and composed of houses each consisting of two rooms—a front room about 6 feet square, and a circular room in rear about 8 feet in diameter. The walls are of clay, and the roof is thatched in beehive shape. They are infested with vast numbers of remarkably tame rats.

The whole district from Kasongo to Fambusi had been more or less devastated by locusts. At Kasongo our Arab prisoners and the friendly natives said that this was the first time that they had ever visited the country. The locusts were travelling south-south-east for about a month, while I was at Kasongo, and it is significant that Commissioner Johnston mentions in his report that his country was visited by locusts about two months later.

The next rapids were those of Lukalonga, formed of dark-coloured rocks. In the middle of the river there was a very large island, thickly populated by a settlement of a vassal of Sefu's. We arrived here on March 23, and were told that this was the last point at which the Arabs had posts. We went on to Kinsali, and thence to Kufi. The country seemed very thickly populated here, having, I suppose, never been raided. The forests came down to the river-banks. There were enormous troops of monkeys. To the east, apparently about 10 miles off, were some very fine mountains. This stretch of the river is about 1 mile wide at high water, not improbably 2 miles if the grass islands be included. The next reach of the river came from the westward, with very high mountains on the left bank. This stream was free from rapids, very slow, and apparently very deep. I found no bottom at 35 feet.

We passed the mouth of the Mukalli on the right bank. It seemed an insignificant tributary. In the angle between the left bank of the Mukalli and the Lualaba there was a high range of hills, and here the rapids began again. After working up them for many hours, we came to a specially difficult one called Nyangi. The fall here cannot be less than 15 feet. There is a curious cone-shaped rock in the middle of the river, about 40 feet high, apparently of white quartz, and on both sides of the river are enormous blocks of quartz, while on the left bank is a cliff of quartz about 90 feet high. This bit of scenery is really magnificent. We camped on an island, which seemed to be a solid block of quartz, with only scrubby grass growing on it. This island is called Katenge, after the chief who owns it, and is about 3 miles long, and from half a mile to a mile wide.

We had great trouble with the natives here. After we had worked all day to make an advance of three-quarters of a mile, Katenge refused us food, and was very savage. He even asked us what our guns were for. Being on an island, we should have starved, but that my men were fortunate enough to catch a cat-fish weighing 100 lbs. We had further difficulties when we left, for the chief would find us neither canoes nor men. We were now beyond the Arab influence, and the natives had not been educated—hence our rough experience. When at last we got started, we found the country very thickly populated, all the people turning out in thousands to see us off. Katenge's boatmen turned over one of my boats in a rapid, as I believe, on purpose. I was looking on, and lost eight men with their whole kit, including cartridges. Kongolo, the great chief in this region, had apparently given orders that we were not to proceed. The paddlers told us that it was impossible to mount the rapids, but we succeeded in persuading them to do so, despite the impossibility. We found Kongolo's village at the head of the rapids, where the river forms a pool, and looks almost like a lake. Kongolo was not pleased to see us, and bolted; but my men caught him, and invited him to dinner, which he eventually provided for us. We were told that there were no more rapids; that we could travel for three weeks or a month up the Lualaba without finding any obstruction. I am sorry I could not verify this; but it is probably not true.

WATER-WORN ROCKS ON THE LUALABA.

We now paddled for a couple of days past islands, the stream running only about two knots an hour. As far as we could see into the interior, village followed village, the river-banks being densely covered with people, brought out by curiosity to see the white man. They were a fine race called Jambulus, fairly well clad in native cloth, the hair of the men being arranged fantastically in various forms. There were two splendid ranges of hills, one on each bank of the Lualaba; those on the right bank are called Muambo, and those on the left bank Kaloni. As the people speak a bastard Batetela, which we could not understand, it is possible that these are not the names of the mountains at all, but only those of the chiefs of the districts.

The Jambulus excel apparently in carving. At Katulu we found some very fine carvings, some cut from the wart-hog's teeth, and some in ivory. There were an enormous number of fetishes hung round the people's necks, teeth and ivory. The axe-handles and paddles were also very well carved in wood. The people do not seem ever to have seen a gun here, or to know what it means. When my men were in line on one occasion, twenty men armed with bows and arrows ran in on us, thinking we were only armed with clubs. All the arrows are poisoned, but the poison does not seem to be invariably fatal, since one of our men who was shot through the thigh recovered.

On the 31st we came to the mouths of the Lukuga, which form a delta. The northern mouth is about 30 yards wide, the southern about 80 yards. The latter has a very rapid current. The Lualaba at the confluence with the Lukuga is about 400 yards wide, and about half a mile higher must be nearly a mile wide. It runs in the direction north 20° west for several miles, and there is no sign whatever of Lake Lanchi, which is marked on so many maps. The Lualaba runs from the mouth of the Lukuga southward, and is so straight that, except for a few palm tops, sky and water touch at the horizon. As soon as we got into the Lukuga, the natives told us this was Tanganyika water. This is interesting, as I see Mr. H. H. Johnston has said that he has never been able to find any natives who call Tanganyika by its name.

The Lukuga above the delta is about 10 feet deep, and was at this season perfectly clear, varying from 1¼ mile to 1 mile wide, with the same depth right across. A great deal of it had long grass growing in it. There was no sign of swamp about its banks. Some miles up we were blocked by grass, but we could follow the course of the river by going against the current, though we could not see the banks. After 3 or 4 miles through the grass, we got an open stretch of water 40 yards wide. The whole expanse of water from bank to bank was about a mile. We stopped at a village called Angoma. The country is very densely populated, but the people did not seem to know anything about the Arabs. They speak a kind of patois of the Batetela language, which a man from Lusuna, in Malela, whom we had with us, could understand. Some hours below M'Bulli's we paddled through the largest flock of birds I have ever seen; the river and river-banks, the islands and plains, as far as the eye could see, were literally covered with spur-winged geese.

We reached M'Bulli on the 5th, where I was taken ill. Opposite M'Bulli there was a high range of hills, which seemed to grow higher towards the east. Delcommune had passed by M'Bulli a year and a half previously. M'Bulli told me that he sent his ivory to be sold at Tanganyika, a journey of six days. Mr. Mohun here took command of the expedition, and returned down the river to Kasongo. After resting at Kasongo for ten days, the abscess in my liver getting worse, I decided to start down the Congo. After fifteen days I arrived at Stanley Falls, and took a steamer back to Stanley Pool.

In conclusion, I would draw your attention to certain general observations.

1. The political geography of the Upper Congo basin has been completely changed, as a result of the Belgian campaign among the Arabs. It used to be a common saying, in this part of Africa, that all roads lead to Nyangwe. This town, visited by Livingstone, Stanley, and Cameron, until lately one of the greatest markets in Africa, has ceased to exist, and its site, when I last saw it, was occupied by a single house. Kasongo, a more recent though still larger centre, with perhaps 60,000 inhabitants, has also been swept away. It is represented now by a station of the Free State 9 miles away, on the river-bank.

2. In harmony with this political change, the trade routes have been completely altered, and the traffic which used to follow the well-beaten track from Nyangwe and the Lualaba, across Tanganyika to Ujiji, or round the lake to Zanzibar, now goes down the Congo to Stanley Pool and the Atlantic.

3. Despite their slave-raiding propensities during the forty years of their domination, the Arabs have converted the Manyema and Malela country into one of the most prosperous in Central Africa. The landscape, as seen from high hills in the neighbourhood of Nyangwe and Kasongo, reminds one strongly of an ordinary English arable country. There is nothing similar, that I am aware of, in any other part of the Congo basin; and yet the Arabs have left the Malela perhaps the most inveterate cannibals on the face of the globe.

4. In all parts of the virgin Congo forest I have visited, wild coffee is so abundant and so excellent, that we left our tins of imported coffee unopened.

5. The centre of the Congo basin, through which stretch the 1000 miles of navigable river and tributary, is an alluvial plain, rimmed in on all sides by rocky ridges, through which the rivers break at points marked by falls or rapids. At some future time, this vast ring of rapids may become the seat of a corresponding circle of mining-centres.

Before the reading of the paper, the PRESIDENT said: This evening we are assembled to hear a very interesting account, as I am sure it will be, of Captain Hinde's adventures in Africa, and of some important exploring work which he accomplished.

After the reading of the paper, the following discussion took place :—

Major-General Sir FRANCIS DE WINTON : I have listened to the paper which has been read this evening with a great deal of interest, because I can trace the advances that have been made within the last ten years, for I took the first boat up the Kasai river, the *Stanley*, the first voyage she ever made. Wissmann brought down a large number of the tribe of Balubas from the central part of Africa, and we took them back. We now learn from the paper of this evening of the advances that have been made since that time. It is very natural for us, from our point of civilization, to feel that the Arabs, as they are called in Central Africa, have been the great hindrance to the advance of whatever power we try to bring into their midst for good, but at the same time I think it only just that we should not confound the so-called Arab of the interior with the Arab on the East Coast. Most of those that drift into the interior, at Nyangwe for instance, began as traders, taking up caravans. They are not the true Arab of the coast, but a cross between the native and the Arab, who afterwards turned into slave-traders, and carry on a double commerce in slaves and ivory. On the East Coast I have had a great deal to do with the Arabs, and I found them men who, if dealt with properly and with a right motive, were always ready to meet one halfway. These half-breeds who drift up from the coast into the interior establish themselves at places such as we have heard of to-night, Nyangwe and Kasongo, and while we cannot help some admiration for the centres of civilization which they created, namely, towns of from 30,000 to 60,000 inhabitants, they have brought the curse of slavery into the country, and by its means they established large commercial centres and maintained these big towns which Mr. Hinde has so graphically described. If you permit me a few minutes, I will say a few words upon other points connected with his interesting paper. He spoke of the Lukuga, which runs out of Lake Tanganyika into the Congo, and forms really one of the watersheds of this rather peculiar lake-region. One year when I was at Vivi, where the river was about a mile wide, we tried to find the bottom at 400 feet and failed; this will give you an idea of the immense quantity of water there. Well, that river rose 14 feet in one night during the rainy season; you can imagine the enormous body of water that must have caused that rise. Three months afterwards some steamers which were at Stanley pool at the time reported that the great lake had broken out. This is interesting, as Tanganyika has no other outlet except one, the Lukuga. In that region aquatic vegetation grows fast. Grown in the lake, it draws towards this inlet and dams it up. When Stanley went there two years after finding Livingstone at Ujiji, he found his former camp 10 feet under water, showing that the lake periodically rises and falls. The water at last bursts through the dam and forms an enormous river, and I believe it was one of those outbursts that gave that rise of 14 feet in one night lower down. Stanley found the banks of the Lukuga giving evidence of very extraordinary floods, as if immense masses of water came down at different periods.

The other point is with reference to what is known as the Congo Free State. If you remember, the second map that was shown to you by means of the magic lantern gave the navigable portions of the different rivers. Now they are building a railway from Matadi up to Stanley pool, a distance of about 230 to 250 miles; about one-third of it, up to Banza Mateka, is finished, and, this portion being built, the railway engineers' difficulties are more or less overcome, because at the commencement they had to break through rough country and had considerable difficulty with rocky obstructions; but that is passed, and now there is only plain country with two rivers to cross, the Kwilu and Inkissi, which they are bridging. I have no hesitation in saying it will be finished in from three to five years, and once that is finished you have the whole of this great horseshoe of the Congo with all its navigable tributaries opened up to trade, with a railway to bring its produce down for the markets of Europe. Now, what does this mean?—and I wish to impress this on everybody interested in Africa, and who desires its development—that you cannot develop Africa until you get rid of what may be termed human transport. You cannot bring the products any distance without a railway, or some other means of carriage other than on men's heads. If you employ these porters, from a commercial point it cannot pay. This railway, built by the King of the Belgians, or the State if they take it over, will open out all the navigable waters of the Congo and its tributaries. If we were to build a railway up from Mombasa, we should have the whole of this lake and the countries round the sources of the Nile open to our European markets, and until our statesmen feel the responsibilities of this question, and take a sensible and statesmanlike view of the question of transport, the development of Central Africa cannot go forward. When they do we shall open markets for our suffering poor at home and kill the slave-trade, and, by enabling white people to live amongst them, civilize Africa in that way.

Archdeacon CHAUNCY MAPLES: I am afraid it is a far cry from Nyasaland to the Congo, but in African matters I think we should feel inclined to say, "One touch of Africa makes us all akin." There were several points in Mr. Hinde's paper on which I should like to offer a few remarks. For instance, about the locusts: people in England hardly realize the extent of this evil yet, although they have read a great deal about what a tremendous scourge these locusts have become throughout Africa. I think Mr. Hinde mentioned that the locusts visited the Congo previous to the time when they appeared on Nyasa last August, when I remember what a terrible thing it was to see them coming in clouds over us, because we knew what that would mean in a few years' time, and no one could say when or where they were likely to stop. When I left Nyasa the dead locusts were, on some parts of the lake-shores, like seaweed thrown up after a storm, and the stench was so great that it was impossible even for natives to pass by at certain places. They are still spreading, and no one seems able to say what will be the end. If this pest continues, at the end of the year there will be a great cry sent up to Heaven for deliverance from the scourge, and we shall be saying, "Locusts, locusts everywhere, but not a thing to eat," throughout the length and breadth of Africa. Mr. Hinde said something about the inquiries he had made as to when such a thing was known before. I have made inquiries too, and remember when first I went to Africa nineteen years ago, in 1876, the natives used to speak about the scourge that had taken place two or three years previously, that is, twenty-two to twenty-three years ago. I invite your attention to that, because I am afraid in a year's time you will hear terrible stories of the results of this visitation, for the locusts mean famine, and famine means war, and the war means death; first many natives will starve to death, then war will come and carry off many of those whom the famine has not destroyed.

Another point dwelt on by Mr. Hinde is especially interesting at the present time. He alluded to the abundance of wild coffee which he found during his travels. Well, coffee-planting is a new industry in that part of Africa brought so picturesquely before you lately by my friend the Commissioner of Nyasaland, Mr. H. H. Johnston. Nothing more encouraging, from the point of view of commerce and the planters, can be found, for I must not speak here from the point of view of a missionary. There is nothing more encouraging, I say, than to see the coffee plantations in the Blantyre region. I believe myself it will attract a very large number of people out there, and if the leaf-disease does not come, we may expect to see a number of our young fellows, for whom it is so difficult nowadays to find work, going out there, and returning to their friends in ten to fifteen years with (let us hope) a fortune made.

But the evening is getting late, and I am sure you will not have much more patience with me if I dilate on other matters, and there are others here who can speak so very much more to the point. I hope, for instance, that my friend Mr. Scott Elliot, whose name was mentioned this evening, may be in the room. We came home together as far as Zanzibar, and I learned from him something about his interesting travels. I suppose you all know the great interest of his recent journey, from the geographical point of view, is centred in the fact that he has discovered that the river Kagera, which pours its waters into the Victoria Nyanza, is navigable for a great part of the distance; and I think I am right in saying that if that route can be opened up, there will be a waterway to Uganda, with only eighteen days of land travel. Most of you are aware of the long and tedious journey to Uganda from the coast, but by this new road to that country one would go up the rivers to Blantyre, and so on to Tanganyika, and I think Mr. Elliot told me that five or six days from the north end of Tanganyika one would strike the river Kagera where it becomes navigable. I only mention this because, if he happens to be in the room to-night, it would be a great pity to lose an opportunity of hearing a few words from him.

Mr. SCOTT ELLIOT: I should like to point out the enormous effect of the work in which Mr. Hinde was engaged. I found the effect of it at the north end of Tanganyika, and all along its eastern shore. I do not think that people realize that the defeat of Rumaliza has been the turning-point of African civilization. This Arab domination, of which he was the type, involved the corruption, morally and physically, of every native race which it came in contact with, and destroyed all kinds of cultivation and industry. I found instances of that all along my route. The work done by the expedition that Captain Hinde accompanied is, therefore, one of the most important it is possible to conceive. With regard to locusts, I must say I do not hold the generally received opinion. In December, 1893, I first came across these locusts after passing the Mau escarpment, and after that date until the middle of the rainy season in the Shire highlands I came across them constantly, practically everywhere. I spent some little time in trying to understand the conditions that influence the abundance of locusts, and I rather think their presence is due to some special climatic conditions when the eggs are being hatched. I don't think there can be a regular cycle of locust years unless there is a corresponding cycle of climatic conditions. Whether that occurs or not is a difficult question. It is, of course, interesting to me to hear Captain Hinde's paper, because I have recently undergone the same difficulties he alludes to. My own experience is that the native, as one finds him uninfluenced by Arab missionaries, is a much better person than where he has been to a certain extent civilized by these Arabs, although in his own opinion he is then a very much better man.

Mr. HINDE: The cause of the locust pest may be looked for in the fact that the greater part of the Central African basin having been in a disturbed state owing to war for nearly three years, the natives did not burn the grass throughout the whole country, as is their custom in the dry season. The locust larvæ were consequently allowed to come to maturity.

Mr. DELMAR MORGAN: It is so many years since I was on the Congo that Captain Hinde's interesting paper is quite a revelation to me. In less than twelve years all that immense territory drained by the upper Congo and its tributaries has been explored and opened to Europeans. In my time (1883) but little of the Congo was known above Leopoldville, and there had only been one expedition to the upper Congo. Great as has been the advance in our knowledge of this region under the auspices of the Congo Free State, I cannot but regret that all this exploring work has not been placed under international control, with the view of protecting the native inhabitants from the aggressive conduct of the white man and the raids of the Arab slave-hunter. Whilst in other countries the contact between the European and the native races has resulted in some good to the latter, in Central Africa, on the contrary, nothing but harm has come of it; and the indigenous growth of civilization, witnessed by the various handicrafts of the people—specimens of which may be seen in the next room—is being stamped out. I must again express regret that the wide and enlightened views of his Majesty the King of the Belgians, who initiated international concert in dealing with Central Africa, have not been developed, and that the aims and views of Livingstone, the best and greatest of African explorers, have not been realized.

The PRESIDENT: Captain Hinde has taken part in an event which will probably be found to be the most important since the discovery of the course of the Congo by Mr. Stanley. The Arab slave-traders seem to have been entirely cleared out of the country. Captain Hinde's independent exploration is also of great geographical interest, in having ascended the Lualaba and completed its exploration as far as the Lukuga. I am sure the meeting will desire me to return him our very hearty thanks for the interesting paper he has given us this evening.

NOTE ON THE MAP OF PART OF THE SOUTH-EASTERN CONGO BASIN.—With the work of the older explorers, whose routes are laid down on the map, has been incorporated material supplied by Captain Hinde, in the shape of sketch-maps made by himself and other officials of the Congo State. The routes covered by these maps are the following: Lupungu—Mulenda—N'Gandu; Kolomoni—Goi Muyassa—Piani Kolomoni—Lussuna; N'Gandu — Lussuna; Funda—Fuanka—Molenda; Lussuna—Piano Chiaba—Lukuna; routes north and south-west of Lusambo. The courses of the Lukuga and Lualaba from Mbuli's to Lukuna are from Captain Hinde's compass-survey, with additions from the survey made by Mr. Mohun ('Mouvement Géographique,' 1894, p. 84). The course of the Lualaba below Lukuna is from Dr. Lenz's survey ('Mitteilungen der k.k. Geogr. Gesellsch. Wien,' 1886, Map viii., scale 1 : 1,130,000).

THE LUCHU ISLANDS AND THEIR INHABITANTS.*

By BASIL HALL CHAMBERLAIN, Emeritus Professor of Japanese and Philology in the Imperial University of Japan.

IV. MANNERS AND CUSTOMS OF THE INHABITANTS.

The manners and customs of a people offer so illimitably wide a field, that it will be best in this instance to pass lightly over points made known by earlier travellers, and to dwell at greater length only on such as are new. Both Basil Hall and Perry, for instance, have described the Luchuan costume and illustrated it pictorially in their works. Their descriptions still hold, except that the elaborate robes and caps of office are no more, now that Luchuan independence itself is at an end, and that officials from Tokyo in European trousers and frock-coats rule the land. In essentials the everyday Luchuan costume resembles the Japanese, being a loose robe for the men as well as for the women. The wearing of two large hairpins by the men—gold, silver, or pewter, according to the wearer's rank—stuck through a topknot into which the hair is gathered, forms a characteristic difference. Young men of all classes shave clean till the age of five and twenty. After that, they let their beards and moustaches grow, though they mostly continue to shave the cheeks. Their gait is dignified, the expression of the face serious, often sad, and sometimes singularly sweet in the older men, whose appearance is most venerable. Their voices, too, are soft and low.

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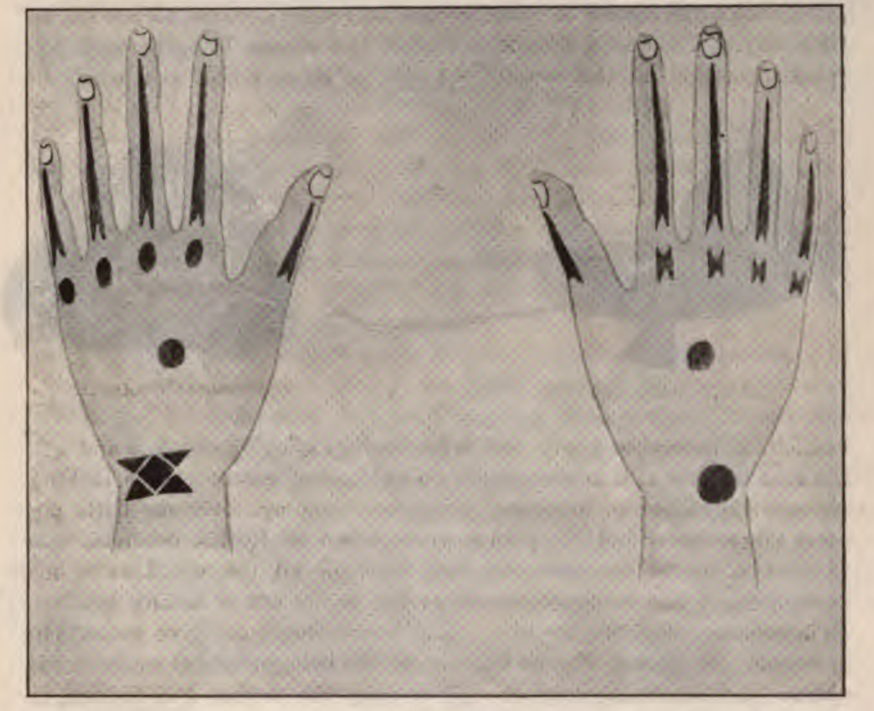
* Paper read at the Royal Geographical Society, January 7, 1895. Map, p. 408. Continued from the April number.

All Luchuan women tattoo their hands. The patterns adopted in Great Luchu are represented in the accompanying engraving. The women of Oshima give free rein to individual fancy. Those of Miyakojima likewise have a great variety of patterns, and continue the tattooing a long way up the arm. In Yaeyama, on the contrary, it is restricted to the hands. The women of the lower classes roll their hair round and round in a twist on the top of the head, and then stick hairpins through it—gold, silver, or pewter (sometimes wood), much less often tortoise-shell * on specially auspicious occasions. The silver-hairpinned ones



TATTOOED HANDS.

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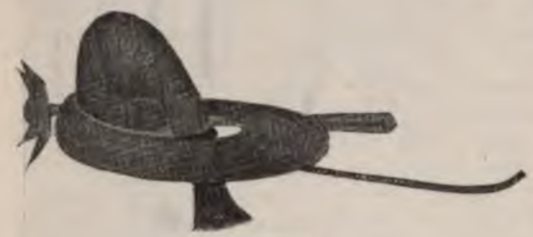
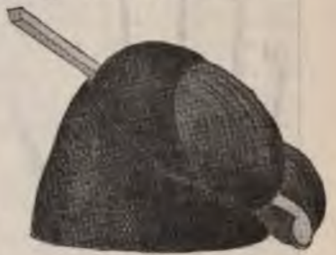
* The tortoise-shell hairpins seem not to have been noticed by any traveller, European or Japanese.

also wear silver rings, the pewter dames wear pewter rings. There being nothing to keep the roll of hair with its hairpins in place, it is apt to lop over on one side, making the wearer look as if she had taken a drop too much. Altogether the appearance of the Luchuan women of the people is little prepossessing, especially to one fresh from Japan, the land of graceful femininity. They fasten their dress over from the right side as often as from the left, which is a dreadful slip of manners in Far-Eastern eyes; and in cool weather they don an over-dress held together by no sash, so that it bulges out and sways backwards and forwards in the wind. Their gait, too, is masculine and striding,—a peculiarity which probably arises from the national custom of carrying all loads on the head. A coolie woman will carry as much as 200 lbs. in this way. The drollest sight is that of the women bringing sucking-pigs to market on their heads. A disk of straw serves as a couch to which the animal is firmly tied, with its legs sticking out fore and aft, so that it looks as if it were taking a swimming lesson. I was looking on one day, when an intending purchaser came up. So one little pig was taken down and his points were shown off by his mistress, who held him up by the tail and hind legs, for all the world as if his swimming lesson had progressed as far as the art of taking headers. The woman asked $1½ for him. The buyer would not give more than a dollar. So Master Pig, as I departed, was being mounted again on his straw pad, screaming loud enough to raise the town. Did fashion, in her wildest flights, ever go further than in thus adding a sucking-pig to the attractions of a lady's coiffure? Curiously enough, there seems to be a general prejudice in Luchu against allowing animals the use of their legs. Pigs, when too big to be carried on the head, are slung on a pole between two men. Goats I saw similarly carried, and never on any occasion did I see pigs or goats driven, as we should drive them in Europe.



MAN'S COIFFURE.



WOMAN'S COIFFURE.

The market-place, which is the centre of life at Nafa, is entirely in the hands of the women, who show no timidity whatever, exposing not only their faces, but their arms and even their legs. This makes the seclusion of their social superiors all the more remarkable by contrast. The ladies of Luchu spend their lives in a retirement so absolute that I never saw one during the whole period of my stay, though the rustling behind screens when I visited my male acquaintances seemed to indicate that the females of the household were peeping at the foreigner from invisible coigns of vantage. Japanese who have spent long periods of time on the islands have recorded the fact that they too never caught a glimpse of a Luchuan lady. To ask a Luchuan gentleman after the health of his wife and daughters, or to allude to their existence in any way, would be the height of impropriety. Rarely does a lady leave the house which is her lifelong home. Should some extraordinary occasion compel her to do so, she retires from view within a closely shut palanquin. How different from the genial Japanese Prefect of Okinawa, whose very first act, on my first visit, was to call in his charming wife, who showed me her latest purchases of local curios just as a European lady might have done!

The Luchuan gentlemen take refuge from the virtuous dulness of their homes by seeking the society of ladies of more facile habits, the number of whom is very considerable. These live in special quarters, and practise the arts of singing, dancing, and conversation. Here is what a recent Japanese author* says about them, and his assertions were borne out, point by point, by my own inquiries made on the spot—

"The Luchuan hetairae differ greatly in their ways from those of the mainland of Japan. They are frank and no flatterers. Every Japanese trader arriving in Luchu engages one, to whom he entrusts everything, even to the management of his mercantile affairs; and when he departs, the girl sells to best advantage the articles confided to her charge, so that when her master comes back again she is able to render him a satisfactory account, in which there is never any error or prevarication to the amount of a single penny. Moreover, this good conduct is the result of natural inclination, not of self-seeking or of vainglory." He adds that, "though generally unversed either in writing or ciphering, they tie knots in cords to assist their memory, and thus manage without error calculations involving tens of thousands of cash."

These women on certain stated occasions dance through the streets for the benefit of the public generally. One of these festivals took place during my stay at Nafa. It was on March 8, which happened to coincide with the twentieth day of the first moon, the day which, according to the old lunar calendar, closes the New Year festivities. I venture to extract the following from my journal for that day:—

"Being told in the morning that a curious procession and dance were to take place, I got up early and hurried off to see it. The crowds were

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[*] S. Ijichi, in the *Ryūkyū Enkaku Chiri.*

dense—numbers of people on the roofs of the houses, and a few even on the roofs of the funeral vaults! These crowds were composed almost exclusively of the lower classes, dirty and perspiring. I twice saw the procession pass—once as a common individual, standing in the sun and jolted by the crowd; once as an aristocrat, for whom space was cleared through the intervention of that ever-delightful individual, the Japanese policeman. The police treated the people pretty roughly, pulling and throwing them about like bundles; but the tortuous narrowness of these coral-wall-lined streets made drastic measures necessary. All the actors in the procession were women, some quite elderly—the owners or duennas of 'establishments'—some little girls, but most young women, all smiling and happy; not delicately fragile like the Japanese, but buxom and healthy-looking, and evidently enjoying to the full the amusement which their bright dresses and their dancing, or rather posturing, caused to the spectators. First came a figure armed with a long stick to clear, or pretend to clear, the way; for in this the Japanese police were the real agents. Then a flag with a picture of a carp swimming up-stream, the well-known symbol of successful endeavour; and immediately after this strutted a gorgeous lion with flowing mane and hair of red, black, green, and lilac, and a bright green face, attended by several dancing-girls in red and a woman with a gong, while behind came two women dressed up like men, and playing on horns which produced a sound rather like that of Scotch bagpipes.

"This closed the first part of the procession. The second part consisted of women pretending to ride toy horses. The third included a number of imitation Chinamen in figured silks, some—perhaps all—representing historical or legendary characters; but the only two I could identify were King Bun* (文 王) on foot, leading the sage Tai-kō-bō (太 公 望) *in a jinrikisha!* This was the sole vehicle in the whole procession. But the most comical spectacle of all was a frail nymph of some fifty-five or sixty winters, who had got herself up like a high Japanese official of the olden time, and danced like mad. To her succeeded a long train of girls and children, each with a scarlet or purple fillet bound round the temples and hanging down behind, and this closed the procession."

It did not, however, close the semi-public doings of the season. The first moon—not the seventh moon, as in Japan—is the time of year when the graves of ancestors are visited, and when takes place what Europeans resident in the East term the Feast of Lanterns, which corresponds to our All Saints' and All Souls' Days. Paper lanterns for use in these memorial services were among the most prominent articles for sale in the Nafa market when I reached the island late in February.

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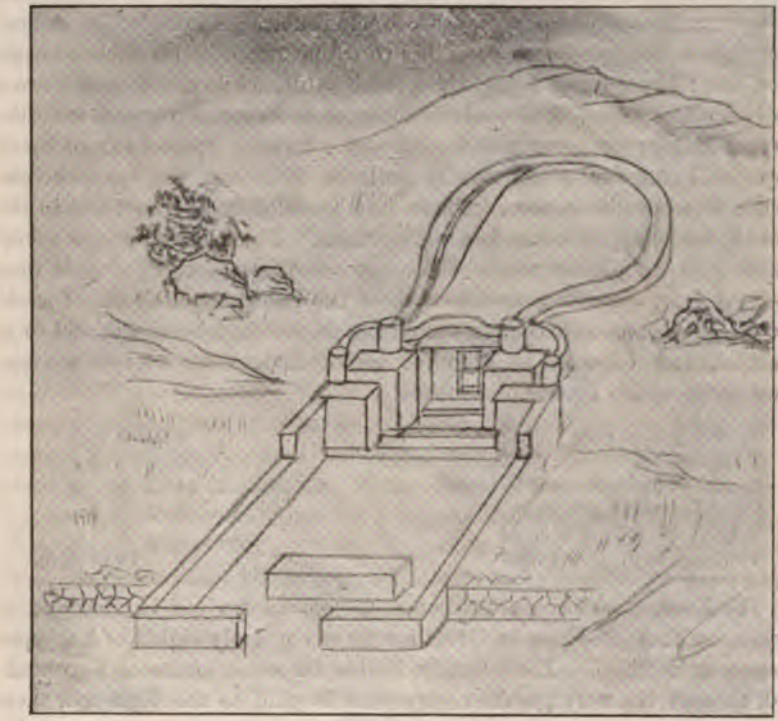
* Here and throughout this paper I have employed the Japanese pronunciation of the Chinese characters. The Pekingese pronunciation of this name is *Wên.*

Probably hygienic reasons have dictated so violent a departure from the orthodox Buddhist calendar. At any rate, it is now officially prohibited to open funeral vaults and wash the bones of the dead during the hotter half of the year.

These remarks bring us to a description of the Luchuan method of disposing of the dead, who occupy a much greater portion of the thoughts of the living than is the case in light-hearted Europe. So large and ubiquitous are the Luchuan graves, so imposing and dazzling is their plastered whiteness, that they attract the traveller's eye even before he lands, remain with him constantly during his sojourn, and are the last thing to fade from his view when the ship carries him away. Luchu, proud in old days of its strict observance of Chinese etiquette, loves to style itself "the Land of Propriety." But the "Land of Picturesque Graves" would be a more appropriate cognomen. Not only physically, but morally also, these graves—funeral vaults one should perhaps rather call them, for each holds the remains of many generations—form the central feature of Luchuan life. They may come into play even commercially; for if a Luchuan in pecuniary straits wishes to raise money, the best thing he can pawn is his family vault. He can



LUCHUAN GRAVE.

raise a good round sum on that, for every one knows that he *must* pay it back. Vault-burial was introduced into Great Luchu from China at least five centuries ago. On the other islands may occasionally be seen specimens of the earlier-fashioned native graves, consisting of a circle of stones around the body, and two long stone slabs as a cover. Old ones are to be met with in secluded districts of Oshima, new ones sometimes in the Further Isles, with the bones of the deceased sticking out. The people of Oshima now bury their dead, Japanese fashion, in small graves with tombstones not very different in appearance from our own. In Great Luchu the vault is of universal and exclusive use. Most are horseshoe-shaped, while a few are rectangular. Perhaps, on second thoughts, a bishop's mitre describes the appearance better than a horseshoe, the mitre proper being the actual vault, while the ribbands are a wall on either side. The vault is sunk, so as to make it equal with the surrounding ground, generally coral rock; but the space in front being lower still (for vaults are mostly built on hillsides), the whole height of the front walls is seen. There is a metal door in front, and in the court there sometimes stands a stone screen. The brilliant white colour comes from the plaster used. Formerly the dimensions of a vault were fixed by law, according to the rank of the family owning it. I could not discover, however, that any such regulation had been adhered to in practice, and I prefer to give the actual dimensions of two average specimens, which I measured myself—

Total height of front	9 feet 8 inches.
Total breadth	22 „ 2 „
Length of court enclosed by walls	24 „ 8 „
Height of opening in front	3 „ 8 „
Breadth of opening in front	2 „ 8 „
Thickness of all stones used	— 16 to 18 in.

The Luchuans have no cemeteries, such as we see in England or Japan; neither are there in Great Luchu any ghastly sights of half-open graves, as in China. Each family builds its vault on its own ground; and, though the very greatest reverence is paid to the departed, there seems to be no superstitious dread of their near presence. As you ride through the country, you will see the peasant digging his field right up to the wall of the vault where lie his ancestors, and where he knows that he himself will lie some day.

When a Luchuan dies, a mosquito-net is hung over the body, and curtains are drawn all around, so that none may see in. The weeping relatives relieve guard, one by one, in the chamber of death. The funeral is attended not only by the family, but by other mourners, who, said to have been originally the servants of allied families, have in modern times developed into a professional class that earns a livelihood by simulating transports of grief. I had heard much about these funerals both from Japanese and natives; and one spring afternoon, while on my way to visit that little gem of beauty, the royal pleasure-grounds at Shikina, I suddenly came on such a procession hurrying along a country lane—the Buddhist priest in front, then the coffin, then a train of some thirty persons, of whom five or six were hired mourners, apparently females, though immense straw hats hid their faces from view. They were attired in coarse cloth made of banana fibre; they uttered the most dismal groans, and tottered so that they had to be supported on either side by assistants, who, as it were, bore them up and at the same time pulled them rapidly along. The portion of the professional mourner's art most difficult of acquirement and most highly prized, is weeping copiously *through the nose.* In the production of these unpleasant tears—for so by courtesy let us call them—the professional mourners are said to attain extraordinary proficiency.

The coffin, having been brought to the vault, is left shut up for two years. In the third year the relations assemble again, and the nearest of kin wash the bones with the strong spirit called *awamori*, and then deposit them in earthenware urns called by the natives *jishi-kāmi*, the price of which varies from 16 cents for the poorest coolies up to $1 20c. (say 2*s*. 3*d*. of English money)* for the gentry. A specimen of each has been sent to the Pitt Rivers Museum, and described in the *Journal of the Anthropological Institute.* Speaking briefly, the urns are temple-shaped, and decorated with such Buddhist emblems as lotus-flowers and horned demons' heads (intended to scare away real demons). The colours—creamy white, blue-green, and yellowish brown—are harmonious and reposeful to the eye. As a rule, the bones of a husband and wife are placed together in the same urn. For children, as also for adult bachelors and spinsters—but Oriental communities harbour few such—there are urns half-size. All the urns of a family are ranged round the interior of the vault on shelves, tier above tier, in order of precedence. The graves of the Luchuan kings are at the Buddhist temple of Sogenji in Shuri. Their funeral urns are said to be magnificent, each costing ten times as much as that of an ordinary gentleman. Unfortunately, I had reserved a visit to this place until the end of my stay, and then illness prevented me from carrying out the intention.

So far as the temple itself is concerned, the loss was probably slight—Luchu, like Korea, having passed out of the stage during which Buddhism was powerful and its religious edifices splendid. Speaking generally, too, the whole Far-East is very little devotional, very little given to speculating on divine mysteries; and Luchu forms no exception to the rule. Not only the upper classes, as is the case in Japan, but even the lower classes, are indifferentists in religious matters, and almost the sole remaining function of the Buddhist priesthood seems to be to officiate at funerals. Nafa has a small and grimy Confucian temple connected with the college in which a small number of young men were formerly trained as Chinese interpreters, and where instruction is still given in the Chinese classics. There are no others in the archipelago. The Buddhist temples are few in number, small, and mostly deserted. Of Shinto temples properly so-called, I saw none excepting a shrine on the Nammin Point at Nafa, erected by the Japanese, and a similar one at Naze in Oshima. Certain secluded and mostly abandoned holy places standing in groves correspond, however, to the Shinto temples of Japan—that is to say, that they are neither Buddhist nor Confucian, but dedicated to native ancestral spirits, and marked off by a straw rope symbolical of worship. There is generally a stone in such sacred spots, under which some ancient worthy's bones are said to rest. We have here, in fact, a very primitive sort of hero or ancestor worship, which has remained undeveloped on account of the unspirituality of the race and the intrusion of Confucianism.

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* The Japanese silver dollar being only worth about half an American gold dollar.

Nor, because a nation is practically without religion, need it be without numerous minor superstitions to which a semi-credence is attached. To this the crematoria for scraps of paper at many street corners bear witness. The idea, borrowed from China, is that a certain sanctity attaches to the written word, and that scraps of paper bearing any writing must not be lightly thrown away, but should be decently cremated. The Luchuan crematoria for paper are, however, quite small things, about 4 feet high, not large elaborate structures such as Mr. Archibald Little describes in his 'Gorges of the Yang Tse.' I also came in contact with a superstitious idea relating to the washing of dead men's bones according to the custom described above. Happening one day to ride past a vault where this ceremony was going on, I dismounted and made towards the spot. The people began to scatter, and my two grooms implored me not to proceed, because, said they, if I did, the dead man's spirit, once scared away by a stranger, would never come to rest again. Of course I gave up the idea of witnessing the ceremony; for what was the satisfaction of mere curiosity compared with the distress of a family already in mourning? On some of the Further Isles (Yaeyama), the natives have a practice of going out into the woods to pray against the ravages of wild boars and of rats. Also they neither fish nor collect edible seaweed for a whole month before harvest-time, for fear of causing a typhoon. A superstitious feeling everywhere displayed is the fear of bad results likely to follow from being photographed. No doubt the Luchuan mind, properly explored during years of continuous residence and familiar intercourse, would furnish a quantity of similar items to the student of superstitions and of folk-lore. I found, too, that even the educated still entertained notions, borrowed from China, of dragons and other unreal monsters, which, however, belong rather to imperfectly developed science than to superstition properly so called.

Quainter still than the funeral customs of the Luchuans, is their usage with regard to weddings. After the "middleman"—the marriage broker, as he might be termed—has negotiated the preliminaries, and proper presents have been sent by the bridegroom to the bride's family, the proceedings are as follows:—The bride is escorted to the man's house at one or two o'clock in the morning, under guard of her relations, the object of these precautions of time and escort being that the affair may not be bruited abroad, and excite impertinent curiosity in the neighbourhood. She and the bridegroom exchange cups of *saké* (rice beer), after which she is at once led home again. This brief ceremony is repeated three nights running, after which she remains three days with her parents, while the bridegroom is carried off by his friends to hold high revel. The object of this step, so far as the man is concerned, is that he may, on the very threshold of matrimony, prove his independence of wifely leading-strings, while to the woman it gives an opportunity to display freedom from jealousy, which is considered the worst of all feminine vices. After three days spent in this manner, the bridegroom goes home, being joined by the bride, who keeps house with him for another period of three days, at the expiration of which the bride goes to her parents' home, whither the bridegroom follows her. Her relations await his arrival with a pestle, painted and ornamented to represent a horse, on which he rides in, while all the boys of the neighbourhood greet his advent with drums and tomtoms, and anything that will make a noise. A grand family feast then takes place, after which the happy couple return home, and the long wedding ceremonies are at last concluded. The married life begun in so original a fashion is said to be mostly harmonious, as the wives yield to their husbands in all things. Should the husband die, the widow almost always remains true to his memory, which is an item of feminine devotion much prized in Far-Eastern lands, where, though a widower marries and makes himself comfortable again as a matter of course, widows are encouraged by public opinion to remain desolate.

Sweet potatoes form the staple food of the Luchuan people. The rich eat rice, and pork, and beef, and fish, and other things many, the general character of their *cuisine* being moulded on that of China. The poor, especially in years of scantiness, eke out their sweet-potato diet with a kind of sago obtained by soaking and pounding the heart of the *Cycas revoluta*, a small tree which resembles the sago palm,* and which, as already mentioned, is allowed to grow everywhere where no better use can be made of the soil. Numberless stories are current concerning the unwholesomeness of this sago—that it gives bad breath, that it distends the stomach without feeding the system, that people sometimes fall down dead after eating it, etc. These tales doubtless require careful sifting and considerable discounting. The foundation of truth in them may be sought in faulty preparation of the sago by many of the peasants—each household manufacturing its own supply—and in bad cooking, the usual Luchuan plan being to make it into dumplings, sometimes pure, sometimes mixed with pounded sweet potatoes—a dish which may well lie heavy on any but the stoutest stomach. Prepared in the European fashion, Luchuan sago is quite palatable and perfectly innocuous. The Luchuans eat their food with chopsticks after the Chinese method; but as they call them by the Japanese name of *hashi*, it is at least possible that these useful implements reached them viâ Japan. There is an alcoholic drink called *awamori*, which resembles Chinese *sam-shu*, and is made of rice and millet. Tea is in general use, as elsewhere in the Far-East, but will not grow on the islands despite attempts to acclimatize it. The poor make their very inferior tea go further by boiling mugwort with it, which is supposed to strengthen the digestion.

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* The Luchuan name is *sōtītsi*, the Japanese *sotetsu*, both being corruptions of the Chinese 蘇 鐵 which means "reviving iron," in reference to a popular idea that this tree is benefited by sprinkling iron near its roots.

The Luchuans sit cross-legged *à la turque*, not with their knees under them like the Japanese, nor are any but the best houses matted in Japanese fashion. Rather are their architectural and household arrangements Chinese in style, the walls being of stone, the rooms small, low, and rarely rising to more than one storey, and the floor being dirty. Each house is surrounded by a stone wall—generally coral—which ensures privacy, but sadly obstructs ventilation; and through a maze of these little low dwellings the narrow street, or rather lane, winds its tortuous way, sometimes muddy, sometimes paved with irregular stones more or less flat. There is less filth in the streets than in China, Luchu in this respect, as in so many others, standing half-way between China and Japan. In the middle of the town is a market-place. There are no vehicles of any kind, nor any public lighting. From time to time packhorses come along, and then pedestrians must be on the look-out; for the absence of a sidewalk and the extreme narrowness of the streets may cause collisions. Such is the general aspect of a Luchuan town—improved, however, at Nafa by the greater comfort and cleanliness which the residence of numerous Japanese officials and merchants has introduced; and made picturesque at Shuri, the capital, by the splendid position of the city on a rocky height, crowned by the ancient castle of the Luchuan kings, now the head-quarters of a Japanese garrison of 137 men. The royal apartments have, it is true, fallen a sacrifice to practical military needs; but the massive stone walls remain intact. In olden days, far back in the Middle Ages, when Great Luchu was torn into three petty kingdoms, and the art of war was still remembered, many castles (*gusiku*, as the Luchuans call them) studded the land, being mostly reared on natural eminences of coral rock by the petty lords and chieftains of each district. Ruins of several such castles still remain, lending great picturesqueness to the landscape. The peasants' huts in the country are mostly put together of reeds, with a straw thatch, and are very poor-looking, though their meanness strikes one as less unendurable under so mild a sky and amid scenery so tranquilly charming than would be the case were they transported to a greyer clime. I nowhere saw any actual beggars.

A few pigs form an indispensable adjunct to every rural abode. Under the old native government, indeed, the rearing of pigs and goats was enforced by law on every household. The pigs are kept in a disgustingly dirty fashion, and are fed partly on excrements, so that it seems a mockery to add—what is nevertheless true so far as many places are concerned—that their styes are made of coral. Large open grassy spaces, often appearing as glades in the forest, form a characteristic adjunct to Luchuan villages which perplexed the early foreign visitors. Called "race-courses," these spaces also serve a variety of other purposes. Here rice is laid out to dry, and the village council meets—or met in old days—goods were bartered, justice was administered, rewards and punishments meted out, festivals celebrated. Nothing exactly similar to this institution exists either in China or Japan.

In piquant contrast to some of the native ways, are those evidences of Western civilization which modern Japanese officialdom everywhere carries with it—the pillar post-box, for example, and the telephone from Nafa to Shuri. Also at the entrance of each village there is now written up the number of inhabitants and the number of children of school age—a device not used in Japan itself, but resorted to here with the object of shaming parents into sending their children to school. To get the girls sent there has been found very difficult—in the Further Isles almost impossible. The following table may interest some readers:—

NUMBER OF PUBLIC SCHOOLS AND CHILDREN OF SCHOOL AGE.
(*December* 31, 1891.)

Divisions.	Number of schools.	Number of children of school age.	Number of children who attended.	Number of children who did not attend.
Nafa	10	6,775	1,256	5,519
Shuri...	2	3,909	710	3,199
Shimajiri	26	16,747	3,722	13,025
Nakagami	15	21,505	1,600	19,905
Kunchan	32	15,646	1,938	13,708
Kume-jima	4	1,314	464	850
Miyako-jima ...	9	6,298	1,087	5,211
Yaeyama-jima ...	3	3,095	584	2,511
Total	101	75,289	11,361	63,928

NOTE.—The above statistics do not include the Middle School or the Normal School. The young men in the latter are all obliged to dress Japanese (*i.e.* European) fashion.

The Japanese language is taught as a subject during the first year of schooling. After that, it is used as the vehicle for instruction in other subjects. I heard, however, many complaints as to the imperfect acquisition of the ruling tongue, and found by personal experience that few as yet understand it away from Nafa, and that even in Nafa itself, and among men holding official posts, the knowledge of Japanese is still wofully imperfect and superficial. Here, as in other countries, a few hours' schooling cannot at once outweigh home influence, which is perpetually pulling in the opposite direction. The Luchuan accent in Japanese, though very marked, is not unpleasing. It reminded me of the Korean accent.

No one walks in Luchu, excepting those who cannot afford some less fatiguing method of locomotion. Well-to-do folks always take a *kagu* —a closed chair borne on a pole by two coolies, and resembling the Chinese palanquin rather than the *kago* of Japan—or else they go on horseback. I generally preferred the latter alternative, as the *kagu* shakes one and hides the view. The diminutive Luchuan ponies have already been mentioned. They are invaluable little beasts, their endurance and docility making up for their Lilliputian size. They are not shod in any way, the metal horseshoes of Europe and the straw horseshoes of Japan being here equally unknown; yet they find their way no less nimbly than surely up and down the wretched tracks which in Luchu do duty for roads, and in which, at every moment, coral crags stick up through the soil like pins and needles. No wonder nobody walks who is not forced to it! In some districts of Japan, especially in the island of Yezo, where the horses are driven in trains of twenty or thirty, all are either leaders or followers, one leader to many followers; and should you get (as, of course, you generally do get) a follower, nothing will induce the obstinate animal to move unless he sees another horse immediately in front of him. This disagreeable state of things does not exist in Luchu, where the ponies are accustomed to going singly. Travellers would, however, do well to take their own saddles, as the native wooden saddle is extremely uncomfortable.

I have said that communication is bad in Luchu. There is indeed one broad and excellent road joining the port of Nafa to Shuri, the capital, distant—so the official mile-post states, for modern Japanese officialdom is nothing if not precise—1 *ri* 11 *chō* 26 *ken* 2 feet and 1 inch (!), say 3½ miles English. A road a few miles long is also now being made from Shuri to a village on the east coast called Yonabara. With these exceptions, there exist in Great Luchu only the paths above described, and in the hilly northern portion of the island even these are absent. European accommodation of course exists nowhere, and there are Japanese inns only at the ports of Nafa and Naze. There is not even any accommodation for strangers at the capital, none of those delicious hot baths, and smiling tea-house girls, and neat traysful of queer, pretty-looking food in Lilliputian morsels, that figure so largely in narratives of Japanese travel. The wayfarer in the interior of Luchu must carry everything with him on horse or coolie-back, and many are the groans of the Japanese officials when obliged to go their country rounds. When possible, they sleep at the village office or school-house; but in the north it is necessary to carry a tent. On the "Further Islands," one sleeps on board the steamer or else at the steamer office. The only point where Luchuan and Japanese travel resemble each other is the civility—the more than civility, the kindness—of the country folk.

One would have thought that, in a roadless country with so much coast-line, travelling by boat would have become common. It does not seem to be so in Great Luchu, though fishermen from Itoman (a village of some six hundred inhabitants) ply their trade on the coast of Kakeroma-shima and stay away for periods of several months, returning home only in January and July with the money so earned. Three men is the usual allowance to each boat. These are a sort of dug-outs, and three or four such dug-outs are often lashed together for company's sake. They are propelled by paddles; and, though easily upset, are also easily righted. The junks, known as *yambara-sen*, are two-masted, and resemble Chinese junks in build. None of them exceed 90 feet in length. Much of the timber for boat-building comes from Japan, the rest from Yambara (Kunchan), the most wooded district of the main island, where too is produced all the firewood and charcoal used in the south of the island. Not infrequently the boats are imported from Japan ready made. The steamer I travelled to Nafa in had three on board.

Steam communication between Japan, Oshima, and Great Luchu is now maintained throughout the year by the Japan Steamship Company (*Nippon Yūsen Kwaisha*), which runs boats once in every eighteen days from Kōbe to Kagoshima, Naze, Nafa, and back again the same way. The accommodation is European; the food of course Japanese, but good of its kind. Two smaller Japanese companies and one Luchuan company compete in the carrying trade, of which sugar is by far the most important item, so that extra boats are run during the busy sugar season—February to June. Bad weather is usually experienced on the passage; and the port of Nafa is so bad that the steamers can only get in and out at high water, and have to be moored to the shore at all times. It is a pity that Unten (Port Melville), which offers better anchorage, should be rendered practically useless by its distance from the chief Luchuan towns. Communication with the Further Isles is by a small steamer only, running twice monthly from Nafa, *viâ* Karimata-Minato in Miyako-jima, to Ishigaki-jima in two days,—at least, that is the schedule time. Beyond Ishigaki-jima there is no regular communication or postal delivery.

I stated at the beginning of this paper that the Governor and the ex-Chief Inspector of Police in Luchu were among those who laboured most kindly for my enlightenment. Questions of practical administration naturally cropped up from time to time in conversation, and it was interesting to find confirmed by their long experience and by the unanimous testimony of every Japanese official I talked with, and every Japanese book on Luchu that I read, Captain Basil Hall's assertion as to the tractableness of the natives and their freedom from crimes of violence—more especially as Commodore Perry had put this praise, together with much else, down to the score of "romancing" on the part of the early English explorers. Petty larceny, every one agreed, was the only decided Luchuan failing, and, for the rest, the land had been ruled in old days "by the mere waving of a fan." Even now there is but one gaol in the whole archipelago. One day the good-natured old Governor said to me, "We will take to-day at random, and see how many people there are in gaol, and what they are in gaol for." The result of the inquiry was as follows:—

PRISONERS IN NAFA GAOL, MARCH 12, 1892.

Offences.	Male.	Female.	Total.
Breaking prison and concealment of criminals	3	—	3
Avoidance of punishment	—	1	1
Forgery of private seals and documents	2	—	2
Murderous intent	—	2	2
Assault	6	—	6
Manslaughter	1	—	1
Murder	—	1	1
Libel	1	—	1
Theft	117	11	128
Fraud and receiving of stolen goods...	20	1	21
Offences connected with stolen goods	4	3	7
Violation of various rules and regulations	5	—	5
Incendiarism (intentional and accidental)	3	4	7
Total	162	23	185

The cause of the solitary murderess's crime was jealousy. Two women had quarrelled about a man—the reverse, perhaps, of what generally happens in Europe.

The cause—and this is more important—of Luchuan law-abidingness may be sought partly in mild government for many centuries; partly in the custom of wearing no weapons, such as those swords which the Japanese, till quite recent years, could not resist the temptation of drawing at the slightest provocation; partly and chiefly in a naturally good-tempered, quiet, even timid disposition. This speaks scarcely less clearly than does the nature of the Luchuan language to the probable absence of any admixture of Malay blood in the race. *Apropos* of the gaols, it may be mentioned that the Japanese authorities cause the queues of criminals to be cut off and their faces shaved, Japanese fashion, in hopes of bringing about the abandonment of the national Luchuan coiffure for men. The effect, however, has been just the reverse, as no one likes to be mistaken for a gaol-bird. In this instance there was certainly an excess of zeal.

The principal industry of Luchu is sugar-planting. In fact, the islands may be said to live by their sugar, as do the three steamer companies who export it to Japan. Great Luchu far exceeds all the other islands in its produce of sugar. In 1891 240,000 casks, each containing 130 "catties,"* were exported; in 1892, 200,000. In 1893, only $\frac{7}{10}$ of the previous year's crop was expected. But as prices fluctuate greatly —from $2\frac{8}{10}$ cents or 3 cents per catty in 1892, to $5\frac{2}{10}$ or $5\frac{3}{10}$ cents per catty at the beginning of 1893—a reduced crop need not always entail decreased profits. The process of manufacture is as primitive as can well be imagined. A long pole, often a mere roughly-trimmed tree-trunk, fastened to the top of an iron or wooden roller which turns two other rollers by means of cogs, is pulled round and round by a horse or bullock, urged to this work by one or two men with sticks, while two other men feed the mill with sugar-cane. The juice thus expressed is boiled on the spot, and then poured into tubs to solidify. The Luchuan sugar is of a very dark colour and coarse quality. Most of it goes to Osaka, in Japan. The manufacture of sugar in Luchu dates from the seventeenth century, having then been learnt from the Chinese.

Besides sugar and a very strong spirit called *awamori*—already mentioned, as resembling the Chinese *sam-shu*—Luchu also produces woven fabrics of several kinds, which are highly prized in Japan, mostly for summer wear. Each island has its speciality—the *tsumugi* from Kume-jima, a silk fabric having light spots or stripes on a very dark ground (an inferior kind is made in Oshima); the cotton *kasuri*—blue from Great Luchu, brown from Yaeyama; the hempen *hosojōfu*, in a blue and a white variety, from Miyako-jima; the *bashōfu* from Oshima, made of banana fibre. It is not likely that any of these would suit the European taste, nor do the primitive methods employed permit of any but small quantities of these various stuffs being produced. Average prices are—

1 *tan* (about 28 feet)	*Ryūkyū-tsumugi*	$3·25
1 „ „ „	blue *kasuri*	1·50
1 „ „ „	brown „	1·25
1 „ „ „	white *hosojōfu*	10·00
1 „ „ „	blue „	15·00
1 „ „ „	*bashōfu*	1·00

In Tokio one has to pay about double; and choice pieces, even in Luchu itself, range much higher, especially the *hosojōfu*, this fine hempen fabric being a special favourite. So exquisite was the care bestowed in former days on the manufacture of *hosojōfu*, that a single piece of 28 feet long sometimes occupied three years in the weaving, as the best work could only be done in dry weather. Such pieces would be sent as tribute to the Government of Great Luchu. It should be added that much of the cotton used in the Luchuan manufacture of *kasuri* is imported from Japan.

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* The Japanese catty is approximately equivalent to 1¼ lb. avoirdupois.

The scarlet lacquer of Luchu is celebrated in the neighbouring countries, and may be recognized by the rich brilliance of its colour, also often by its raised decoration in other and duller hues, the subjects being mostly flowers, especially the chrysanthemum. Hogs' blood enters as one ingredient into the basis of the less good sort. Purple is a colour very frequently employed for the decoration. Formerly scenery and figures were also introduced, and large handsome pieces thus adorned could be obtained; but this is now rarely the case. Indeed, the whole art has deteriorated owing to that double curse of our times—exhibitions, and the demand for quantity and cheapness. The best shop in Nafa, when I visited it, was filled with abortions in the shape of hideous large red lacquer breakfast cups, saucers, and even spoons, all of European shapes, perpetrated for export to America in connection with the Chicago Exhibition. How humiliating (is it not?) to see that in art, as in manners and in morals, the West cannot touch the East without corrupting and depraving it! However, that is not our present subject. Take them all in all, the productions of Luchu, whether natural or manufactured, are not very important. Some of the articles most needful to civilized life she has to import—wood, for instance, much of which for boat-building purposes comes from Japan, as already incidentally mentioned.

(*To be continued.*)

THE BIOGRAPHY OF SIR BARTLE FRERE.—REVIEW.*

By Sir FREDERIC J. GOLDSMID, K.C.S.I., C.B.

A MANIFESTLY superior intelligence and singularly attractive manner would have made Sir Bartle Frere a welcome companion in the choicest of social circles, had he never been called upon to take part in affairs of state as a ruler or adviser of his fellow-men. When he became a recognized statesman, entrusted with the discharge of high official duties, his intellectual and social powers could not fail to strengthen and impart lustre to his position; while at no time of his career could it be alleged that leadership in any way affected the Christian charity and consideration inherent in his nature. Such a man is eminently a fit subject for biography; and though to some minds eleven years after death may appear too long a period to await the written record of a prominent actor on the stage of politics, with its ever-shifting scenery, for some also a certain lapse of time may lend truth to the retrospect. Questions which agitate the world's politicians are historical as well as ephemeral, and there is far more of the former than the latter character in those discussed in the two handsome volumes quite recently submitted to the reading public by Mr. John Martineau. That they should meet with notice in our *Journal* needs no apology, for Sir Bartle was one of the Society's most esteemed presidents, and every inch a geographer.

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* 'The Life and Correspondence of Sir Bartle Frere, Bart., G.C.B., F.R.S., etc.' By John Martineau (John Murray: 1895).

Whether the thoughtful face and tall, stately figure of the subject of this biography are better rendered in the official costume of vol. i. than in the ordinary dress of vol. ii., will, perhaps, be doubtful to many. Each is excellent in its way: and each in its artistic verity serves as a fitting title-page to a faithful and graphic narrative. Nor is the word-portrait, so carefully executed by the biographer, and practically "touched" in every succeeding page, more remarkable for its accuracy than its consistency. The true man is ever before us; hopeful in difficulty, prudent in prosperity; cheerful in trial, calm in success; collected in danger, vigilant in repose; always considerate, never pretentious or self-glorious; courageous in act as in design, but cautious of impulse; strong in fixed principles of justice and rightful expediency, yet ever ready to hear, and sift in detail, all argument opposed to his own, provided it be not in opposition to those principles. Without proposing to enter upon a minute or critical review of these most interesting volumes, we may glance at the salient passages of the career which they describe, by the use of geographical names. When resident in Sattara, Frere's delicate mode of conducting an annexation of territory, obnoxious in his own eyes as to the native communities concerned, exemplified a noble and exceptional diplomacy. His tenure of the Commissionership in Sind was a triumph of statesmanship—evinced in an enlightened general supervision, a never-failing tact, and a judicious attention to details. Promotion to the higher Councils of India in Calcutta, and the government of an Indian Presidency in Bombay, was but the natural sequel to the career of the previous twenty-five years. The subsequent summons to undertake the government of the Cape of Good Hope, addressed to him at a time of great difficulty—effectually diverting, as it did, the exercise of his administrative talents to a new field in South Africa—was, perhaps, disappointing to those Indian friends and admirers who would gladly have welcomed him as their viceroy; yet must it be regarded as a proof of confidence in his "all-round" ability. For thus it happened that, nine years after completing his period of Governorship at Bombay —during which interval, in addition to the performance of other important duties, he occupied a seat in the Home Council of India, proceeded on a special mission to Zanzibar, and accompanied His Royal Highness the Prince of Wales on an Indian tour—he received a letter from the Home Secretary, Lord Carnarvon, which was nothing short of an appeal to his patriotism and an invitation to resume official harness such as he could not ignore. In this letter was the following passage: "My hope is to induce you to accept the difficult and responsible, but, as I believe, the most important task of undertaking the government of the Cape, which becomes vacant on December 31, nominally as Governor, but really as the statesman who seems to me most capable of carrying my scheme of confederation into effect, and whose long administrative experience and personal character give me the best chances of success."

The proffered task was accepted. How it was accomplished became, unfortunately, a matter for divided opinion among statesmen at home. Though already known to many in outline, this phase in the colonial record merits a closer study than in reference to mere historical facts. It might then be made evident that, in spite of the adverse fiat and discourteous procedure of those who chanced to be his official judges, Frere's work in South Africa was really the greatest work in his life. Fairly weighed and sifted, it would in all likelihood stand forth as no failure, but an interrupted success; a conception never carried out, or to be carried out on his own lines, but comprehending the foundation of a stable colony and peaceful united South Africa, with an ideal of Imperial Government in origin essentially his own.

In England there has, perhaps, been a tendency on the part of even the supporters of Sir Bartle Frere's policy to treat the Zulu war as though it were the best of a bad choice—the sanction to evil that good might come. Those who were his fellow-workers in India, however, know how little a motive of mere expediency could influence him on such an occasion, and how impossible it would have been for him to infringe the rights of a savage chief, although the end obtained were British supremacy and the confederation of the South African colonies. The conviction that the safety of Natal and the Transvaal depended on bringing Cetywayo at once to book, and obtaining from him satisfactory pledges of future good behaviour; that his relations with ourselves justified our use of dictation; that we were demanding from him no more than we should under like circumstances have felt bound to demand from an independent powerful neighbour, such as France or Russia; and that we were really strong enough to enforce compliance, if necessary, while powerless to prevent a massacre if the outcome were left to chance —to this alone may be attributed the despatch of the ultimatum, some of the requirements of which, be it observed, had already been insisted on by other authority. We have the strongest grounds for rejecting the notion that the attainment of confederation, however desirable, was the one object of his measures. He believed that this would ensue at its proper time. The immediate aim was peace with security—a status which could only be realized when Cetywayo's licence was held under control.

Favourable as may be our estimate of the whole book under notice, it is impossible to deny that the chapters relating to the Cape have a specially romantic as well as historical interest. Frere's visit to the Boer camp in the Transvaal (vol. ii. pp. 292–297) is excellently described, and the description—as also the relation of all South African incidents—will command the reader's attention and sympathy. That the last-used word should apply to the hero of the narrative, when unmeasured congratulation should have been the natural result of his labours, is one of those instances of the irony and perversity of Fortune which philosophers may weep over but cannot remedy. If the wisest of men has laid down that "the race is not to the swift, nor the battle to the strong," we need not be surprised that the repeated confirmation of this truth is found in the lives of the best and noblest of public servants. Nor can we marvel that, while the *mens conscia recti* remains a source of true consolation under trials, it needs more than human fortitude to restrain all outward sign of disappointment at the failure of worthily conceived intentions. The Cape Governor did, undoubtedly, feel the withdrawal of confidence in his measures by the home authorities to be both unjust and unnecessary; and if a sense of wrong was afterwards apparent in word or act, what wonder? Laocoon, invaded by the serpents—"*perfusus sanie vittas atroque veneno*"—is no longer the priest in repose.

But there is no warrant, in the biography or elsewhere, for the supposition which seems to have got abroad that Frere's last days were passed in "humiliation." Such a word is surely out of place in the description of so high and single-minded an individuality. That in his projects for the common good, he left no margin for self-interest, is quite true; and as for party considerations, which might have suggested to him provision for an evil day, he set these wholly aside in the performance of his duty. In his case, however, there was no actual loss of character or "humiliation"—a term which would imply, if not a loss of social position, the possible admission of derogatory act.

Sir Bartle joined the Royal Geographical Society in 1867, and was nominated a member of its Council in the following year, as again in 1869, and a Vice-President in 1870, 1871, and 1872. He was elected President in 1873. In June, 1874, he delivered an instructive address, which would have been remarkable if only for its appreciative notice of Livingstone, who had died in May of the previous year. But it was replete with matters of current and general interest. When giving up the chair on the same occasion to Sir Henry Rawlinson, the latter expressed his regret and that of the Fellows that the Council had been unable to persuade him to remain in office. "The Report of the

Council," were the words of the new President, "showed that during that year the Society had increased in a marked manner both in numbers and reputation; and for that exceptional prosperity they were, no doubt, greatly indebted to the high personal character of Sir Bartle Frere, united with his very special qualifications for the office." In 1874 his name is borne on the list of Vice-Presidents; in 1875, of Members of Council; and in 1876, of Vice-Presidents again. Absence from Europe causes a gap after this date, but we find him again enrolled among the Councillors in 1880–81, and among Vice-Presidents in 1882–83. At the first meeting of the Society after his lamented death in May, 1884, Lord Aberdare, the President for that year, referring to him as "one of their most distinguished Presidents," stated with truth that "no public servant had left behind him a purer and nobler name than Sir Bartle Frere." Sir Richard Temple, in his obituary notice of the deceased, contributed to a number of our former *Proceedings*, made use of an appropriate Oriental metaphor in assigning to him "a high-caste mind." The biography which has just been published affords ample proof of the truth of both propositions; and to these we may now add, as an extract from its pages, the words of our present President, quoted by Mr. Martineau. Bearing testimony to the active interest taken in geographical work by this not the least approved of his able predecessors in the chair, and his anxiety to promote every enterprise which had for its object the advancement of geographical science, Mr. Clements Markham states—

"Sir Bartle had been an accomplished geographer long before he was officially connected with the Society. In his many-sided way, he had been accustomed to look at administrative questions in India from a geographical point of view, and he used to say that geography and statistics were the two bases of departmental work. His mind was well stored with the thoughts arising from this way of considering the innumerable points he had had to decide in his long official career. Hence he always had some original and often very valuable suggestion to make when geographical questions were discussed in his presence. He saw at once, with wonderful quickness and precision, in what way the broad principles established in his mind through long consideration of the general subject bore on any new point that came before him. His power of exhibition was admirable, so that his own thoughts, never vague nor confused, were quickly conveyed in the clearest way to those with whom he acted. As a friend in council he had few equals, both from his thorough grasp of subjects under discussion, and from the extent and accuracy of his previous knowledge. Proposals and schemes which had long been in abeyance were quickly disposed of, and those which contained the germs of usefulness were put into practicable and working shape under his guidance. The indescribable charm of his manner had much to do with the smoothness and facility with which the official machinery worked under his presidency; but when it was necessary, he displayed unbending firmness.

"His great pleasure was to show kindness and consideration for young men whose work came before him, and to inspire them with confidence. He was quick in distinguishing real merit from charlatanry, however cleverly veiled; and the former always secured the greatest and most patient attention at his hands. There was nothing which struck those with whom he acted so much as the total absence of any personal motive, however slight, in all he did or said.

"As to his own individual share in any measure or undertaking, he was absolutely indifferent. In this he always seemed to be the purest type of a public servant. To him the general good was everything, his own share in producing it absolutely nothing. Thus it was that there was many a suggestion made by him, many even matured plans which bore valuable fruit owing to his initiative, with which his name will never be connected in the remotest way. As a geographer his knowledge was not only sound, but, in many branches of the subject, and these far from being all connected with India, it was minute and detailed. He often displayed such detailed knowledge quite unexpectedly and on most unexpected points, so that where we only anticipated in him a general adviser we often found an expert."

This is no mere eulogy or conventional tribute of respect to the memory of a more than average good man. It is an estimate of character which can be certified in the memories, or illustrated in the note-books of those who have enjoyed the privilege of Sir Bartle Frere's acquaintance and friendship. Illustrations indeed—such as here referred to—would abound, although unlikely to find a place in set biography, as bearing upon comparatively obscure episodes. Of the many which readily occur to the mind of the present writer, two might be cited to exemplify his unobtrusive, and therefore unrecorded usefulness. They refer to the active part he undertook, at one time, in securing an acknowledged western frontier to Baluchistan; at another, in promoting telegraphic communication between England and India. Both questions were of high significance, and in both the object involved was attained. But the importance of results gives no guarantee that the story of beginnings will not fade into oblivion.

THE TRIANGULATION OF AFRICA.

By General E. F. CHAPMAN, C.B.

The following letter, on the desirability of international co-operation for the purpose of obtaining the materials for an accurate map of Africa, has been sent to Mr. Clements R. Markham, C.B., President of the Royal Geographical Society, by General E. F. Chapman, C.B., Director of the Intelligence Division, War Office:—

I am anxious to bring before you a subject, connected with geography, which has been engaging my attention for some time past.

It appears to me that, great as has been the development of political and commercial interests in Africa during the past decade, our knowledge of the topography of the interior of the country has not made an advance by any means as important, and that there are large portions of that continent of which no accurate maps exist, although they have been for years under a civilized administration and occupied by settlers of European descent.

I, therefore, venture to suggest to you that the occasion of the meeting of the International Geographical Congress in London this year offers an invaluable opportunity for considering how a reasonably accurate and complete map of Africa can be built up, and for urging upon the different governments and geographical societies the advantages of united action.

Would it not be possible to ask the Congress to point out to the civilized States of Africa, the great importance, from an economic as well as from a scientific point of view, of carrying out geodetic surveys, wherever it is practicable to do so?

In South Africa, geodetic triangulation of a high class has been carried out in the Cape Colony and Natal; but it has not been connected trigonometrically with the Bechuanaland triangulation, although it almost touches it.

To turn this triangulation to practical account, it is, of course, necessary to extend secondary and tertiary triangulation from it over all the settled lands, in order to provide fixed points to which to tie the detail, and to which the boundaries of the numerous farms can be referred. Unfortunately, this has been but partially done in the Cape Colony and Natal, and it is only in British Bechuanaland that we see a definite scheme being consistently carried through.

In Lower Egypt triangulation for revenue purposes is being executed by the officers of the Irrigation Department, but its advantages have unfortunately been minimized by the difficulty of finding sufficient money to meet the expense of providing permanent marks.

In Algeria, on the other hand, the French have been more alive to the necessity of having a regular survey, as is shown by their excellent maps of that country. This survey is now being rapidly extended over the adjacent Protectorate of Tunis.

Italy, too, has seen the advantage of pushing on triangulated surveys, and has turned out minutely detailed maps of the country adjoining Massawa.

Where Europeans settle in Africa regular surveys must, sooner or later, become indispensable, and by commencing them as soon as a country is occupied, a great eventual saving is effected, as is well shown in the report of the Surveyor-General, British Bechuanaland, for the year 1890–91, from which I take the following extract:—

"From a practical point of view, the value of this work can hardly be overrated; in many countries erroneous surveys are one of the most fruitful sources of litigation and waste of money in connection with disputed land-boundaries, necessitating very often the enormous expense of subsequent geodetic triangulations and re-surveys of land grants. The Imperial Government has conferred a great boon on this territory by authorizing a goedetic triangulation as the basis of all future survey operations; . . . we are indebted for the great practical advantages we are already reaping from this work, viz. the correct and uniform data supplied to our surveyors, which enables them to do their work in a satisfactory manner, and the great facility and accuracy with which, in this office, we are enabled to lay down on the map of the country the results of every survey which has been connected with the trigonometrical piles."

I think it will be admitted that the completion of the geodetic survey of the

South African peninsula is a work which is urgently needed, and that it is to be regretted that the Orange Free State and the South African Republic have hitherto neglected this very necessary part of the duty of a civilized State.

The British South Africa Company, which is now laying out its territories for occupation and development, has an excellent opportunity for taking the lead in this matter, by starting a geodetic survey of its occupied areas in Matabililand and Mashonaland, which should eventually be pushed across the Zambezi into the country north of that river.

In the Nyasa Protectorate, as much labour has been expended in sketching routes and taking astronomical observations as would probably have sufficed, under proper direction, to produce a trigonometrical survey of the greater portion. Such a survey must eventually be made, and I think there can be little doubt that the truest economy would be to start it at once.

Still, it must be admitted that there are large portions of the continent of which fairly accurate maps are eminently desirable, but which are likely for many years to remain untouched by regular surveys. The requisite topographical information regarding these areas might in time, where the country is of a suitable nature, be obtained with comparatively little expense by the system of plane-tabling, based upon rapid triangulation, that was carried out by our officers in Afghanistan, and has since been extended with so much success, under the direction of Colonel Holdich, C.B., R.E., over Baluchistan.

A certain amount of this class of work has already been executed by English officers in various regions, viz. in Somaliland, on the Anglo-German boundary in East Africa, at Wadi Halfa, at Suakin, and on the Anglo-Portuguese boundary in South-East Africa.

It is, of course, impossible to dictate to independent travellers the line that they are to take, or the class of survey that they are to adopt; but it seems to me that the Royal Geographical Society might do much to influence intending travellers, especially those whose professed aim it is to aid the cause of geography, if it could induce other societies to join with it in impressing upon the travelling world that the requirements of the present day are fairly complete surveys of areas, rather than mere routes. Route traverses, whether supported or not by a few astronomical observations, are in many parts out of date. There are some areas scored all over by the tracks of explorers, of which we are still unable to put on paper anything like a sufficiently good general map on a fairly large scale. Should the geographical societies think fit to give it to be understood that the right way to aid geographical science is to make a fairly complete survey of a district rather than to add one more long thin line across from sea to sea, I am confident that we should advance much more rapidly than at present towards a complete knowledge of the Dark Continent.

In order, however, to utilize to the full any such surveys as may be made, it is necessary that we should be able to locate them with accuracy. To do this we must have in their immediate vicinity points so accurately fixed that their values are above criticism. Where we still have to depend upon route traverses, such points are even more necessary. Triangulation, even of the most rapid class, moves comparatively slowly, and it appears certain that for years to come geographers will have to depend largely on other methods. I wish, therefore, to raise the question as to whether anything can be done in a comprehensive manner to provide the framework of accurately fixed points that is so much needed.

It seems to me that much might be done by a system of co-operation and exchange between the different governments and the various geographical societies of Europe, and I would venture to suggest that by their united action it might be possible to arrive at a list of all the well-fixed places in non-surveyed portions of Africa, and to inaugurate concerted measures for establishing the positions of the other places of sufficient importance.

Geography, at present, suffers not from a want of observers, but rather from an excess of observations of a kind that cannot be trusted, which only increase the compiler's difficulties instead of removing them. No doubt almost every observation that is taken throws some light, confirmatory or otherwise, on those taken by previous travellers. Where, however, as often happens, there is a discrepancy between the new and the old results, it is of the utmost importance that we should obtain full information as to the trustworthiness of the new observations. In this matter the Germans have set an excellent example to other nations; and if their practice were more generally followed, there would be far more certainty of all observations being taken at their proper value. At the same time, it is eminently desirable to get observations of a better class than was formerly possible. If the various governments or societies could arrange to send competent observers to the countries in which they are interested, how many important places might be fixed in longitude by means of the telegraph lines that are now spreading over the continent in all directions! The points thus determined would go far towards providing the framework that is so much wanted.

In Asia, also, there is one matter which might well be brought to the notice of the Congress. I allude to the question of joining the great trigonometrical survey of India with the Russian triangulation. The Congress could, no doubt, express an authoritative opinion as to the value, from a scientific point of view, of the results to be obtained from the completion of this work, an opinion which would do much to influence the governments concerned to consider whether they could provide the funds necessary to carry it out.

To sum up, my suggestions are that the Congress should be invited to consider and bring to the notice of the various governments concerned and to the geographical societies of the world, the following subjects:—

(1) The advantages to be gained from an economic, as well as from a scientific point of view, of extending geodetic surveys in the settled portions of Africa.

(2) The importance, in districts beyond the probable range of geodetic surveys for the next few years, of making surveys of areas rather than of routes; and the advisability of basing such surveys on rapid theodolite triangulations, wherever it is practicable to do so.

(3) The desirability of collecting a complete record, as regards Africa, of all the positions that have been accurately fixed astronomically in areas that have not been triangulated, and of combining measures for the purpose of determining new positions, taking care that, in the case of all future observations, full data should be published so as to enable the geographical world to appraise them at their proper value.

(4) The advantages to geodetical science of trigonometrically connecting the triangulation of India with that of Europe by joining it on to the Russian triangulation of Trans-Caucasia.

THE GEOGRAPHY OF MAMMALS.*

By W. L. SCLATER, M.A., F.Z.S.

No. III.—THE NEOTROPICAL REGION.

SECT. 1.—BOUNDARIES OF THE NEOTROPICAL REGION.

THE Neotropical Region is, no doubt, after the Australian, the most distinct of all the regions. It includes not only the continent of South America, but the West Indies, Central America, and a considerable portion of southern Mexico. As regards its northern termination, on account of the great admixture of Nearctic and Neotropical forms which takes place where the two regions join, it is impossible to lay down anything but an approximate boundary. Mr. Wallace (11) draws the line from the mouth of the Rio Grande on the Atlantic side to the neighbourhood of Mazatlan, in about the same latitude, on the Pacific side, but bends it down between these two points so as to include in the Nearctic Region the whole of the high tableland down to the city of Mexico.

Some American naturalists, among others Merriam and Allen (1), include in the Neotropical Region the southern extremities of the peninsulas of Lower California and of Florida. This, however, appears to be unnecessary, at least so far as the mammals are concerned, though there are certainly a considerable number of Neotropical birds and insects found in both these districts.

Besides the mainland of Central and South America and the West Indies, the Falkland Islands and the Galapagos must likewise be included in the Neotropical Region.

The West Indies form an important subregion, containing some forms of great interest, and will be treated of in detail below.

The Falkland Islands are situated in the south Atlantic, about 250 miles east of the nearest point of Patagonia. They are, however, known to be connected with the mainland by a shallow sea of less than 100 feet in depth, and therefore present all the characteristic features of a "continental" group of islands. The only indigenous mammals are a wild dog (*Canis antarcticus*) and a vesper-mouse (*Hesperomys*), which seem to be distinct, though closely allied to the mainland forms. The birds also are mostly identical with those of the mainland, though there are some just recognizable representative forms.

The Galapagos, a group of five larger and ten smaller islands, are situated in the Pacific, exactly under the Equator, at a distance of from 500 to 600 miles west of Ecuador. They rise up from very deep water, and are entirely of volcanic origin. They are therefore typical "Oceanic" islands. With the exception of two vesper-mice, slightly differing from those of the mainland, and a peculiar bat (*Atalapha brachyotis*), there are no indigenous mammals (2) in the Galapagos. There are, however, a considerable number of birds in these islands, most of them not found elsewhere, and many of them restricted to individual islands in which they represent each other (7).

There can be no doubt that the Galapagos have never, at any period of their history, been joined to the mainland, or to one another, and that, owing to the fact that they are situated in the region of equatorial calms, immigration from the mainland is very occasional. In this way has been gradually evolved the peculiar fauna, which, although highly specialized, shows abundant evidence of having been derived from the nearest mainland.

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* Continued from vol. iv. p. 35. Map, p. 512.

SECT. 2.—GENERAL VIEW OF THE MAMMAL FAUNA OF THE NEOTROPICAL REGION.

The Neotropical Region is essentially one of luxuriant tropical vegetation, the great mass of the land from Central America to Uruguay being occupied by vast forests. South of the tropic of Capricorn the woods soon disappear, and the country, over a large part of its surface, becomes a flat treeless expanse covered with more or less abundant pasture known as the pampas, while all along the western coast extends the giant range of the Andes, the eastern flanks of which are, as a rule, well watered and wooded, while the western slopes from the Gulf of Guyaquil to the island of Chiloe facing the Pacific are utterly dry and arid. There are, however, also in the higher parts of Venezuela, the Guianas, and Southern Brazil, open grassy plains called "campos," which rise as islands from a surrounding sea of evergreen tropical forest.

The mammalian fauna of the Neotropical Region is naturally a rich one, but in the number of genera and species falls considerably short of that of the Ethiopian Region. This may perhaps be accounted for by the physical features of the country, which are certainly not so favorable for mammalian development as the more open and varied country of Africa.

This deficiency in mammalian life is, however, more than counterbalanced by the abundance of other groups of animals, more especially of birds and insects, to the development of which the luxuriant tropical vegetation seems to be especially conducive.

Again, the mammalian fauna of the Neotropical Region is quite as remarkable for what it does not possess (lipotypes) as for what it has. Everything points to the conclusion that during a long geological age, probably throughout the greater part of the Tertiary epoch, South America was entirely isolated from the rest of the world. Thus the present fauna has arisen from two quite different sources—first, from the original fauna of early Tertiary times; and, secondly, from immigrants from the north, some of these being of rather long standing, and others of later arrival.

Of the nine orders of terrestrial mammals, representatives of eight occur in the Neotropical Region, the only order entirely absent being the monotremes, which are absolutely confined to Australia.

The marsupials are represented in the Neotropical Region by a single family only, out of seven into which this order is usually divided. This is the *Didelphyidæ*, or opossums, of the twenty-four generally recognized species of which one (*Didelphys marsupialis*) ranges north with some modification into the Nearctic Region.

The third order of mammals—the Edentata—is highly characteristic of the Neotropical Region. Of the five generally recognized families two belong entirely to the Old World; the other three—the sloths, the ant-eaters, and the armadillos (which are more nearly allied to one another than to the two Old World families)—are, with the exception of one species of armadillo (*Tatusia novemcincta*), which extends into Texas, absolutely confined to the Neotropical Region. Besides the three living families of edentates, there are two (the *Megatheriidæ* and *Glyptodontidæ*) now extinct, which are chiefly characteristic of the Neotropical Region, though remains of them have also been found in certain formations in North America (6).

The fourth order of mammals, the ungulates, is very poorly represented in the Neotropical Region, four only out of the fourteen usually recognized families being found within its limits. The peccaries (*Dicotylidæ*) consist of only two species, of which one (*D. tajacu*) ranges as far north as the Southern United States, and the other is confined to the Neotropical Region. A second family, the *Camelidæ*, is shared by the Neotropical Region with the Old World. The representatives of this family in the New World are the lamas, belonging to the genus *Auchenia*. They are entirely confined to the higher ranges of the Andes and to the desolate plains of Patagonia.

The deer (*Cervidæ*) of the Neotropical Region all belong to two peculiar genera (*Cariacus* and *Pudua*), of which the former extends northwards throughout the United States to British Columbia, while the latter is found only in Chili.

Finally, the tapirs (*Tapiridæ*) are represented by four species, all of which are peculiar to this region, the only other existing tapir known being the Indian tapir of the Malay Peninsula. The explanation of this curious case of discontinuous distribution is afforded by the past history of the group. During Miocene and Pliocene times, members of this genus and its allied forms were found both in North America and also throughout the Old World from France to China. This gives us direct evidence of the former much wider extension of the family of tapirs, and bridges over the present great gap in its distribution.

As already stated, the fauna of the Neotropical Region is almost as remarkable for the absence of certain families as it is for the presence of peculiar forms. This is specially noticeable in the Ungulata. There is no existing representative of the four great families of the oxen, rhinoceroses, horses, and elephants in this region, though remains of the latter two groups have been found in most recent deposits of Argentina. Here they were probably immigrants from the north, which survived but a short time in this locality.

Turning now to the rodents, we find that out of the four chief divisions into which this order is separated—the squirrels (*Sciuromorpha*), the mice (*Myomorpha*), the porcupines (*Hystricomorpha*), and the hares (*Duplicidentata*)—the first two and the last contain very few peculiar genera and no peculiar families in this region. But, on the other hand, out of the six families of *Hystricomorpha* four are restricted to this region, while of the remaining two, one (the *Octodontidæ*) is found elsewhere only in Africa, and the other the porcupines (*Hystricidæ*) is of wide distribution. Moreover, all the neotropical genera of the Hystricomorphine division are, without exception, confined to this region.

The Carnivora, which follow next, are well represented in the Neotropical Region, but belong generally to families of wide distribution. But one family, the raccoons (*Procyonidæ*), with the exception of a single genus (*Ælurus*), which is perhaps doubtfully referred to it, is entirely confined to the New World. On the other hand, the *Viverridæ*, so widely spread in the Old World, are entirely absent in America.

With the exception of some four or five species of shrews, which have obviously spread southwards from the Nearctic Region, wherein they are found in considerable numbers, the Insectivora are represented in the Neotropical Region only by a single remarkable family. This is the solenodont—a characteristic form of the Greater Antilles—absolutely unknown elsewhere. The Insectivora are usually considered to be the most generalized of all the mammalian orders, and to be the least-changed descendants of the ancestral group from which most of the other orders of mammals have originated. If this be the case, it seems strange that we should find no traces of them on the continent of South America, which was, doubtless, long isolated from the rest of the world, and which still contains many representatives of primitive and declining types. The Palæontological history of the Insectivora is, however, as yet very incomplete, as very few fossil forms of this order have been described. It is, therefore, possible that when future discoveries have increased our knowledge on this subject, this seeming anomaly may be explained.

The Neotropical bats (*Chiroptera*) are of great interest; they are included in three families, of which two (*Vespertilionidæ* and *Emballonuridæ*), although containing several peculiar genera, are found in other parts of the world, but the third (*Phyllostomatidæ*) is entirely confined to this region.*

This family, which numbers among its members the true vampires or blood-sucking bats (*Desmodus* and *Diphylla*), is a very considerable one, numbering at least sixty species, distributed among thirty-three genera, which are doubtless still to be supplemented by future discoveries.

Finally, the Neotropical Region possesses two families of monkeys, the marmosets (*Hapalidæ*) and the capuchins (*Cebidæ*), neither of which are found elsewhere. Moreover, both these groups are distinguished from their Old World allies by very important anatomical characters, which render them absolutely distinct from the Old World monkeys and apes.

Summarizing these statements, we find that the Neotropical Region is characterized by the exclusive possession of no less than ten families of mammals, namely—

Bradypodidæ (sloths);
Myrmecophagidæ (ant-eaters);
Chinchillidæ (chinchillas);
Dasyproctidæ (agoutis);
Dinomyidæ (dinomys);
Caviidæ (guinea-pigs);
Solenodontidæ (solenodonts);
Phyllostomatidæ (vampire bats);
Hapalidæ (marmosets);
Cebidæ (capuchin monkeys);

and by the presence of about 130 genera, of which 103 are restricted to its boundaries.

On the other hand, when we compare the fauna of the Neotropical with that of other regions, the deficiencies or "lipotypes" are manifestly considerable. For example, the following ten families of mammals, all fairly well spread over the rest of the world except Australia, are entirely absent from this region:—

Bovidæ (oxen).
Equidæ (horses).
Elephantidæ (elephants).
Lagomyidæ (pikas).
Viverridæ (civets).
Talpidæ (moles).
Pteropidæ (fruit-bats).
Lemuridæ (Lemurs).
Cercopithecidæ (Old World monkeys).
Simiidæ (anthropoid apes).

SECT. 3.—SUBDIVISION OF THE NEOTROPICAL REGION.

The divisions of the Neotropical Region adopted by Mr. P. L. Sclater, mainly from a consideration of the class of birds (8), are six in number, namely—

1. The *Antillean Subregion*, containing the Greater and Lesser Antilles, exclusive of Tobago and Trinidad.
2. The *Central-American Subregion*, containing all that part of the whole region that is north of Panama.
3. The *Columbian Subregion*, containing Trinidad and the slopes of the Andes, through Venezuela, Colombia, Ecuador, and Peru, into Bolivia.
4. The *Amazonian Subregion*, embracing the whole watershed of the Orinoco and Amazons up to the hills, and including the highlands of Guiana.
5. The *South Brazilian Subregion*, containing the wood region of South-East Brazil, Paraguay, and the adjoining districts.
6. The *Patagonian Subregion*, containing Patagonia, Southern Argentina, and Chili, and running up the west coast of the continent to Guyaquil.

This division, although no doubt perfectly good when the distribution of birds is mainly relied upon, presents considerable difficulties in the case of mammals, owing chiefly to our ignorance of the limits of the distribution of the greater number of the South American mammals, especially of the smaller forms. There is, however, no doubt that the Antilles or West Indies (excluding Trinidad and the other islands off the coast of Venezuela, which are connected with the mainland by quite shallow water) form a very well-marked subregion, in which the terrestrial mammals, though not very numerous, nearly all belong to peculiar genera.

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* One species, *Macrotus californicus*, has been found as far north as California.

The higher ranges of the Andes from Ecuador southwards, together with the pampas of Southern Argentina and Patagonia, form another well-marked subregion characterized by a number of peculiar genera and species. But the whole remainder of the Neotropical Region from Mexico to Southern Brazil contains, so far as we understand it at present, a more or less homogeneous mammal-fauna, of which, however, the northern half possesses a considerable admixture of Nearctic forms, while the southern preserves a more purely indigenous facies. It will, therefore, be quite in accordance with the facts of nature, as well as convenient, to separate the northern portion of this extensive area as the Central American (or Transpanamanic) subregion. But as regards the southern portion, until our knowledge of the distribution of South American mammals has made greater progress, it seems best to unite the Colombian, Amazonian, and Brazilian subregions of the Ornithologists into one combined subregion, which may be called the Guiano-Brazilian Subregion.

We shall thus have, as regards mammals, four subregions of the Neotropical Region, as follows:—

1. The *Antillean Subregion*, comprising the whole of the West India Islands except Curaçao, Trinidad, and Tobago.
2. The *Central American Subregion*, comprising the lowlying and southern parts of Mexico and Central America as far as the Isthmus of Panama.
3. The *Guiano-Brazilian Subregion*, comprising the greater part of South America from the Isthmus of Panama to the southern limits of the great forest in about lat. 30° S., and from the forest of the eastern slopes of the Andes to the Atlantic, including Trinidad and the other islands off the coast of Venezuela.
4. The *Patagonian Subregion*, comprising the higher ranges and western slopes of the Andes from Guyaquil to Tierra del Fuego and the pampas of Argentina and Patagonia.

SECT. 4.—THE ANTILLEAN SUBREGION.

The mammal-fauna of the Antillean Subregion is exceedingly poor, so poor, indeed, that it seems almost doubtful whether the islands of which it is composed have ever been directly connected with the mainland of America as at present constituted. To begin with the rodents, four genera of this order are represented within its limits, and three of these are restricted to the subregion. *Megalomys* (a large rat, over 12 inches in length without the tail) is allied to the vesper-mice of the American continent, and has been obtained only in the islands of Martinique and St. Lucia, where it is now becoming very rare (10). A more important factor in the Antillean mammal fauna is *Capromys*, a genus allied, according to Flower and Lydekker, to the coypu rat of South America, but also showing some affinities to the porcupines. There are five or six species of this genus usually recognized, of which two or three are restricted to Cuba, one is peculiar to Jamaica, and one to the Bahamas, while another species has been recently discovered in Swan Island, situated in the middle of the Gulf of Mexico. An allied genus (*Plagiodon*) with one species, differing from *Capromys* only in a slight modification of the teeth, is found in Hayti. It is obviously derived from the same stock. A peculiar species of agouti (*Dasyprocta cristata*) is found in two of the Lesser Antilles—St. Vincent and St. Thomas; the other members of this genus belong to the mainland of Central and South America. The only other order of terrestrial mammals represented in this subregion is the Insectivora, and this is the more remarkable because, as already shown, one of the special characters of the Neotropical Region is the almost complete absence of this group within its limits. The West Indian representatives of this order are two in number, and belong to a peculiar genus (*Solenodon*), which is of rather doubtful affinities and is of family rank. It is allied in some respects to the moles (*Talpidæ*), and in others to a peculiar Madagascan family, the tanrecs (*Centetidæ*). The solenodonts are small creatures with a somewhat shrew-like aspect, a long snout, and a long naked tail. There are two representative species of this genus confined to the islands of Hayti and Cuba respectively.

The bats of the Antillean islands, as would naturally be expected, are somewhat more abundant than the terrestrial mammals. There have been recorded by naturalists about thirty species belonging to some twenty genera as found in the different islands, the greater number being from Cuba and Jamaica. On examining the list, it will be found that of these twenty genera three only seem to be confined to the West Indian Region, while thirteen are spread over the greater part of the Neotropical Region, one belongs to the Nearctic Region, and the others are of wider distribution.

The evidence of the bats, therefore, points unmistakably to the inference that the West India Islands have been peopled with mammalian life from South and not from North America. In this connection it may be noted that Mr. Frank Chapman in an instructive article (4) on the origin of the West Indian fauna, recently published, has stated, as regards the birds, that the total number as yet recorded as met with within the limits of this subregion amounts to 550. Of these 303 are endemic, while the remaining 247 may be allotted to the countries from which they have been apparently derived as follows:—

Common to North and South America	16
Of general distribution in the tropics	56
South American (ten in the Windward Islands, three only in the Greater Antilles)	13
Central American	3
North American (all annual migrants from the north, through Florida, and the larger proportion found in Cuba)	160

This summary gives us a clue to the origin of the more recent additions to the West Indies fauna, which is obviously by migration from the north. If, however, the relationships of the 303 endemic species are examined, it will be at once evident that they are all more closely allied to South American than to North American forms, and, like the bats, show that the islands have been stocked with life from the south. Moreover, Mr. Chapman, as well as Mr. Wallace, has pointed out that nearly all the more distinct and most characteristic West-Indian birds are found in the Greater Antilles (*i.e.* Cuba, Hayti, Porto Rico, and Jamaica), and that the Lesser Antilles form a distinct group, the line of separation between the two provinces coinciding nearly with the deep channel between the Virgin Islands on the west, and the Anguilla group on the east.

On the whole the Lesser Antilles appear to have derived their fauna direct from South America, but probably in times considerably remote, and without the assistance of a land-connection. The almost complete absence of terrestrial mammals and of representatives of sedentary and non-migratory birds in the Lesser Antilles seem to show this. For instance, Grenada possesses only fifteen land-birds also found in Trinidad, and of these none belong to the sedentary families, although the two islands are only separated by an interval of 75 miles of sea. On the whole, therefore, it seems probable that, although the Lesser Antilles have derived the bulk of their fauna from South America, they have never been directly connected with that continent.

Of the Greater Antilles, Jamaica and Cuba have by far the richest endemic faunas, whereas in Hayti and Porto Rico the total number, as well as the number of endemic species, is considerably smaller. Jamaica, therefore, with its small area (one-tenth of that of Cuba, one-eighth of that of Hayti, and a little more than that of Porto Rico), and in spite of its more isolated position, contains on the whole, so far as our present knowledge goes, the richest fauna.

This may, perhaps, be explained by the fact that between the north-east corner of Honduras and Jamaica there stretches a series of more or less shallow banks, so that a comparatively slight elevation of the intervening sea-bottom would very nearly connect Jamaica with the mainland.

Whether such a complete land connection (or only an approximation of land areas) by this route ever existed, cannot at present be definitely settled. On the one hand, as pointed out by Mr. Chapman, the disproportionately rich fauna of Jamaica, the shallow sea, and the West Indian affinities of Swan Island (as shown by the presence of a species of *Capromys*) lead to such a direct connection. On the other hand, the scarcity of land-mammals in Jamaica and Cuba, and the absence of many families of birds found on the mainland, rather point the other way. The help in these questions to be derived from palæontology is up to this time very scanty. The only remains of fossil mammals that have been yet obtained from the West Indies are certain detached teeth and some fragmentary bones, found in some caves in the island of Anguilla, which is situated just to the east of the deep channel separating the Greater from the Lesser Antilles, and must, therefore, be included in the latter province. These remains have been described by Prof. Cope (5), who considers them to be related to the Chinchillas, a family of rodents confined to South America.

The nature of the mammalian genera of the Antillean Region is summarized in the subjoined table:—

	Rodents.	Insectivores.	Bats.	Total.
Endemic	3	1	4	8
Nearctic	0	0	1	1
Neotropical	1	0	12	13
American	0	0	1	1
Cosmopolitan	0	0	2	2
Total ...	4	1	20	25

SECT. 5.—THE CENTRAL AMERICAN SUBREGION.

This subregion, as has been already shown, contains the coast-lands of Mexico lying along the Pacific and Atlantic shores from Mazatlan on the north on one side, and from the Rio Grande on the other, together with the whole of Central America from the Isthmus of Tehuantepec to that of Panama.

As regards the fauna of this part of America, we are fortunate in being able to refer to the excellent account of it contained in the 'Biologia Centrali-Americana' of Messrs. Salvin and Godman. The volume relating to the mammals in this work was undertaken by Mr. Alston, and finally completed after his death by Mr. P. L.

Sclater in 1882 (3). Out of a total of sixty-nine genera of mammals represented in this subregion, only two seem to be absolutely restricted to it, and these, moreover, are genera of bats, which may possibly be found at some future time to extend into the main South American continent.

Of the sixty-seven non-peculiar Central-American genera of mammals, forty-one are Neotropical types—that is, found also in one or more of the other subregions of this region—five are Nearctic, nine are found both in the Nearctic and in other subregions of the Neotropical Region, and twelve are cosmopolitan, or, at any rate, found in some part of the Old World as well as in the New.

These facts show conclusively the thoroughly Neotropical character of the Central-American Subregions, which, although the admixture of northern forms has really made very little progress, may be defined as that part of the Neotropical Region which has been subjected to an incursion of Nearctic types.

The marsupials in the Central American Subregion are represented by two genera containing about seven species, most of which are also found further south. One of these—the common opossum (*Didelphys marsupialis*)—extends northwards into the Nearctic Region as well as far southwards into Brazil, where, however, it has a slightly modified form.

The edentates are well represented in the Central-American Subregion by two sloths, three ant-eaters, and an armadillo, although the greater number of these are met with only in the most southern portion of the subregion. The armadillo (*Tatusia novemcincta*) is a widely spread species, ranging from Texas throughout the subregion, and extending southwards to Paraguay.

Central America is also remarkable for possessing two out of the four American species of tapir exclusively confined to it; these are Baird's tapir (*Tapirus bairdi*), extending from Mexico to Panama, and Dow's tapir (*T. dowi*), found only in Guatemala and Costa Rica.

Very few of the typical South American Hystricomorphine rodents extend as far north as Central America. The greater number of the animals of this order found within Central American limits belong to the Sciurine and Murine groups, which have spread southwards from their homes in the Nearctic Region.

Passing on to the Carnivora, we find nearly all the genera of this order met with in the South American continent (amongst which are the cats, dogs, raccoons, and weasels) also represented in this subregion. The only exceptions are *Icticyon*, a peculiar form of wild dog restricted to South-East Brazil, and the Bear (*Ursus*), a species of which is found in the Andes of Peru.

The bats of Central America are fairly numerous, and nearly all belong to South American genera. A large proportion of them are referable to the *Phyllostomatidæ*, one of the characteristic mammal-families of the Neotropical Region.

Finally, as regards the monkeys, the marmosets (*Hapalidæ*) appear to be represented only by a single species, which is an intruder into the extreme southern end of the subregion. Of the other family of American monkeys (*Cebidæ*), about eight species, against a total of at least sixty found in the Guiano-Brazilian Subregion, occur in the Central-American Subregion. Of these five are peculiar, or not yet ascertained to occur elsewhere.

The following table gives the statistics of the origin and distribution of the Central-American genera of mammals. The "Endemic" genera are those confined to this subregion; the "Nearctic" genera are those common to this subregion and the Nearctic Region; the "Neotropical" genera are those common to this subregion and one or more of the other subregions of the Neotropical Region; "American" designates those found in both the Neotropical and Nearctic Regions, and "Cosmopolitan" those met with also in the Old World.

	Marsupials.	Edentates.	Ungulates.	Rodents.	Carnivores.	Insectivores.	Bats.	Monkeys.	Total.
Endemic ...	0	0	0	0	0	0	2	0	2
Nearctic ...	0	0	0	2	2	1	0	0	5
Neotropical	1	4	1	6	2	0	22	5	41
American ...	1	2	0	0	4	1	1	0	9
Cosmopolitan	0	0	1	4	4	0	3	0	12
Total ...	2	6	2	12	12	2	28	5	69

The inspection of this table will show at a glance that the Central-American Subregion is predominantly "Neotropical" as regards its mammals, but has received a small immigration of Nearctic forms, and possesses only few endemic types.

SECT. 6.—THE GUIANO-BRAZILIAN SUBREGION.

This extensive area, in which is combined three of the subregions usually allotted to birds, is the largest and by far the richest of the four divisions of the Neotropical Region adopted in the present article. It extends from the Isthmus of Panama in the north to about 30° south latitude. But the southern frontier between this and the Patagonian Subregion is very undecided, the fauna of Uruguay and the northern part of the Argentine Republic containing forms characteristic of both subregions. The western boundary is formed by the well-watered and forest-clad western slopes of the Andes, the waterless eastern slopes, together with the inland basin of Peru and Bolivia from the neighbourhood of the equator downwards, being referable to the fourth or Patagonian Subregion.

The greater part of the Guiano-Brazilian Subregion consists of forest, and the mammalian fauna, though tolerably abundant, is not nearly so profuse as that of the birds and insects, which are here both developed in far greater luxuriance than in any other part of the world.

This subregion is more especially the home of the peculiar Platyrrhine monkeys, the arboreal sloths, and other tree-loving mammals.

Beginning at the bottom of the list, we find that nearly all the twenty-four species of opossums known from the New World are found within its limits. The peculiarly modified water-opossum (*Chironectes*) occurs all over its area, but also extends into the Central-American Subregion.

Among the edentates the sloths are the most characteristic inhabitants of its forests. But two peculiar genera of armadillos (*Xenurus* and *Priodon*) are confined to the subregion, and several other species of this group occur there. All three genera of ant-eaters are also here met with.

Rodents are very abundant in this subregion, but, with the exception of squirrels (*Sciurus*), vesper-mice (*Hesperomys*), pouched mice (*Heteromys*), and a single hare (*Lepus*), they all belong to the Hystricomorphine group, which is so highly developed in the Neotropical Region.

The Guiano-Brazilian Subregion is also the special home of the Phyllostomine bats. Out of a total of about sixty-five species of this family forty-four are found in this subregion, and the greater number of them are confined to it. Such, too, is this the case with the Platyrrhine monkeys. The marmosets (*Hapalidæ*) would be also unknown outside the limits of the subregion had not a single species, as already mentioned, overstepped the northern boundary at Panama. The capuchins (*Cebidæ*), numbering more than sixty species and belonging to ten genera, are likewise abundant, and are found elsewhere only in the Central-American Subregion.

The following table shows at a glance the numbers of (1) the "Endemic" genera of this subregion, *i.e.* those not found beyond its limits; (2) the "Neotropical" genera, *i.e.* those confined within the limits of the whole region; (3) the "American" genera, *i.e.* those occurring in other parts of the New World, but not beyond; and (4) the "Cosmopolitan," *i.e.* those of general distribution :—

	Marsupials.	Edentates.	Ungulates.	Rodents.	Carnivores.	Insectivores.	Bats.	Monkeys.	Total.
Endemic ...	0	2	0	9	1	0	11	7	30
Neotropical	1	6	0	8	1	0	23	5	44
American ...	1	1	2	0	4	1	1	0	10
Cosmopolitan	0	0	1	3	4	0	3	0	11
Total ...	2	9	3	20	10	1	38	12	95

SECT. 7.—THE PATAGONIAN SUBREGION.

The Patagonian Subregion may be most conveniently taken to begin on the south side of the bay of Guyaquil, and to extend thence southwards, embracing the whole western slope of the Andes of Ecuador and Peru. In Bolivia it widens out and includes the high plateau of Titicaca, extending thence over the whole of the Argentine Republic, Chili, and Patagonia.

The most characteristic form of the mammals of this subregion is the lama, which, with its allies, constitutes the genus *Auchenia*. Four forms, usually regarded as distinct species, are recognized by naturalists. Of these two, the lama (*Auchenia glama*) and the alpaca (*A. pacos*) are only met with in a domestic state, and are very variable in size and colour. Of the other two, which are met with wild, the guanaco (*A. huanacus*) has the most extensive distribution, ranging from the highlands of Ecuador and Peru, along the Andes, to the open plains of Patagonia; while the vicugna (*A. vicugna*), which is a somewhat smaller animal, is found only in Ecuador, Peru, and Bolivia.

In addition to the lamas, this subregion possesses a species of thickly haired mountain tapir, differing from the lowland forms, and two or three peculiar deer, of the subgenus *Furcifer*, which are likewise densely furred. A third diminutive deer found in Chili is distinguished from *Cariacus*, the ordinary American form of deer, by anatomical characters, and belongs to a special genus, *Pudua*.

The rodents of the Patagonian Subregion almost all belong to the Hystricomorphine section of the order. Amongst them are the chinchillas (*Chinchilla* and *Lagidium*), noted for their delicate fur, the viscacha (*Lagostomus*), and the Patagonian cavy (*Dolichotis*). Out of the eighteen genera of this division known to occur in the Patagonian Subregion, ten are restricted to it.

Of the carnivorous mammals of this subregion, one of the most interesting is the spectacled bear of the Andes (*Ursus ornatus*), which affords an instance of that rare phenomenon in nature "discontinuous distribution," the nearest allied species of bear (the black bear of North America) only coming as far south as Mexico. The presence of a bear in the Andes can only be explained by the supposition that the ancestral form migrated southwards along the line of the Cordilleros, but has died out in the intermediate district. The bats of the Patagonian Subregion present but few features of interest; they are, with one exception, all of genera found also in the Guiano-Brazilian Subregion.

As might have been expected from the dearth of forests and the generally severe climate, the American monkeys and marmosets are entirely unrepresented in the Patagonian Subregion. On the other hand, at least two small species of opossum (*Didelphys* and *Dromiciops*) occur in Chili, and a very remarkable form of armadillo (*Chlamydophorus*) is peculiar to Western Argentina and the high plateau of Bolivia.

The following list of the mammal genera of the Patagonian Subregion is constructed on exactly the same plan as that of the preceding tables:—

	Marsupials.	Edentates.	Ungulates.	Rodents.	Carnivores.	Bats.	Total.
Endemic	1	2	2	10	1	1	17
Neotropical ...	0	2	0	7	2	5	16
American ...	1	1	1	0	1	2	6
Cosmopolitan ...	0	0	1	1	4	2	8
Total ...	2	5	4	18	8	10	47

Sect. 8.—The Past History of the Neotropical Mammal Fauna.

During the last few years our knowledge of the extinct mammals of the Neotropical Region has been enormously increased by the discoveries of the palæontologists of the Argentine Republic, more particularly by the labours of Burmeister, Moreno, and Ameghino. A few words about this branch of the subject may be added.

The oldest formation containing well-preserved remains of mammals yet investigated is in the neighbourhood of Santa Cruz, in Southern Patagonia, where the deposits are about 200 feet in thickness. The exact age of the Santa Cruz beds it is very difficult to determine, but the best authorities consider that they cannot be of earlier date than the Upper Eocene or Oligocene of Europe. Following these in point of time are the so-called "Patagonian" beds of Patagonia and Uruguay, which are probably of Miocene age. The "Araucanian" formation of Ameghino, which is well developed at Monte Hermoso, near Bahia Blanca, in Southern Argentina, seems to correspond approximately with the older European Pliocene. Finally, the later Pliocene is apparently represented by the "Pampas" formation of Argentina and Uruguay. Our knowledge of the extinct mammal-faunas of these beds is mainly due to the efforts of the Argentine palæontologists just mentioned, but a clear *resumé* of the work done will be found in a recent number of the *Geological Magazine* (12).

In the "Santa Cruz" beds have been found remains of about one hundred and twenty genera of mammals referable to the following orders:—

Marsupials. **Edentates.** **Perissodactyles.** **Toxodonts.** **Rodents.** **Primates.**

Among the marsupials the most prominent forms in this formation are the opossums (*Didelphyidæ*), which are still found all over America, and in Tertiary times appear to have been distributed nearly all over the northern hemisphere. But accompanying these are other forms of the same order, which seem to be more nearly related to the Australian marsupials of other families; in fact, Ameghino has placed some of them in the (hitherto supposed to be) exclusively Australian family *Dasyuridæ*.

The fossil edentates of this formation are all of the American section of the group. The Perissodactyle Ungulates are represented by two families (*Proterotheriidæ* and *Macraucheniidæ*) not very definitely connected with other perissodactyles, and unknown elsewhere; and the toxodonts (another group forming a distinct suborder of the Ungulata) are also quite unrecognized outside South America, where, indeed, they appear to have existed for a short period only.

The rodents of this formation all belong to the Hystricomorphine section of the order, and the primates are all platyrhine, so that, except in the case of the marsupials, where the results are to a certain extent doubtful, no clue to the origin of the Neotropical fauna is shown by this extinct fauna. When these results are compared with the Eocene mammal fauna of the northern hemisphere, the absence of artiodactyles, insectivores, bats, carnivores, and lemurs, is very striking.

The "Patagonian" beds contain a mammal-fauna only to be distinguished from the previous "Santa Cruz" series by a further differentiation of genera belonging to the same orders without any traces of foreign admixture. When, however, we reach the more recent Araucanian formation, we find, in addition to the edentates, toxodonts, and other typical South American forms, a number of foreign intruders, such as tapirs, lamas, elephants (*Mastodon*), and wild dogs (*Canis*), of an entirely different aspect. There can be little doubt that these animals had migrated here southwards from North America, where their remains (or those of closely allied species) have been likewise found in the nearly contemporaneous formations of the United States.

Moreover, it would seem that in these bygone days, not only did the northern forms move southwards, but that also some of the southern forms emigrated northwards. This is evidenced by the fauna of the so-called "*Equus* beds" and "*Megalonyx* beds" of a slightly later date in the United States, which contain a composite mammal-fauna of northern forms mixed with forms usually considered to be exclusively South American—such as the gigantic armadillo-like *Glyptodon*, the capybara (*Hydrochœrus*), *Toxodon*, and others.

Finally, in the age of the "Pampas" beds, the peculiar South American mammal-fauna seems to have reached its culminating-point, and to have far exceeded that of the present day both in number of species and in the size of the individuals. This great increase in size, which is, as a rule, accompanied by an extreme specialization of individual organs, seems to have had a fatal effect on its possessors, as none of the larger edentates or toxodonts appear to have outlived the end of the pampas formation. Along with most of the larger arrivals from the north, such as *Mastodon* and *Equus*, they became extinct. All the conclusions to be derived from this much-abbreviated account of the extinct mammals of South America, confirm in a remarkable way the evidence of the present fauna as to this history of the Neotropical Region. Up to the last period of the Tertiary epoch, South America was certainly isolated from the rest of the world, and the connections with Australia and with Africa, if they ever did exist, must have been previous to this period. At the beginning of Pliocene time, during the deposition of the Araucanian formation in Argentina and the "Equus" beds in the United States, a wide bridge between North and South America, affording an easy road to migrating animals, must have existed, and this again seems to have become considerably narrowed to form the present Isthmus of Panama.

List of Authorities referred to.

(1) Allen, J. A.—"The Geographical Distribution of North American Mammals." *Bull. Amer. Mus. N.H.*, iv. p. 199, 1892.

(2) Allen, J. A.—"On a Small Collection of Mammals from the Galapagos Islands, collected by Dr. G. Baur." *Bull. Amer. Mus. N.H.*, iv. p. 47, 1892.

(3) ALSTON, E. R.—'Biologia Centrali-Americana, Mammalia.' London, 1879-82.

(4) CHAPMAN, F. M.—"Notes on Birds and Mammals observed near Trinidad, Cuba, with remarks on the Origin of West Indian Bird-life." *Bull. Amer. Mus. N.H.*, iv. p. 279, 1892.

(5) COPE.—"Description of two large extinct Rodents from Anguilla, West Indies, with remains of human art associated." *Proc. Amer. Philos. Soc. Philad.*, xi., 1871, p. 183.

(6) LEIDY, J.—"Remarks on *Mylodon*." *Proc. Acad. Nat. Sci. Philad.*, 1885, p. 49.

(7) SALVIN, O.—"On the Avifauna of the Galapagos Archipelago." *Trans. Zool. Soc.*, ix. p. 447 (1876).

(8) SCLATER, P. L.—"Address to Section D. (Biology)." 'Report of Forty-fifth Meeting of the British Association at Bristol,' p. 85 (1876).

(9) THOMAS, O.—"On some Mammals from Central Peru." *P.Z.S.*, 1893, p. 333.

(10) TROUESSART, E. L.—"Note sur le rat musqué (*Mus pilorides*) des Antilles." *Ann. Sci. Nat. Zool.* (6), xix. No. 5 (1885).

(11) WALLACE, A. R.—'The Geographical Distribution of Animals.' 2 vols. London, 1876.

(12) ZITTEL, K. A. VON.—"The Geological Development, Descent, and Distribution of the Mammalia." *S.B. k. bayer. Akad. Wiss.*, xxiii. p. 137, 1893. Translation in *Geol. Mag.* (3), x. p. 401 (1893).

THE MONTHLY RECORD.

THE SOCIETY.

The Anniversary Dinner.—It has been decided to postpone the Anniversary Dinner to Tuesday, July 30, the object being that it may coincide with the meeting of the International Geographical Congress. The Society will thus be able to show some hospitality to the Government delegates and distinguished geographers who will be in England then. In order that the Congress may prove a success, a further sum of £1500 is required, in addition to what has been subscribed. It is hoped that many of those Fellows who have not subscribed will see their way to doing so without further delay.

EUROPE.

Evaporation in Central Europe.*—At a recent meeting of the Austrian Meteorological Society in Vienna, Professor Penck communicated the results of researches on the amount of evaporation taking place over extensive land-surfaces. Direct measurements of evaporation have been made in Austria and Bavaria since 1821, and in Prussia since 1876, by means of various types of evaporometers, of which the most recent and satisfactory is that of Wild, and observations are now forthcoming from forty stations in different parts of Central Europe. It seems that the average yearly evaporation in North Germany amounts to 15·7 inches; and that further to the southward a decrease to about 11·8 inches (at Dresden) takes place; then again a slight increase, and a final diminution near the slopes of the Alps and Carpathians. In the Hungarian plain the evaporation is much greater, amounting to 25·6 inches at Budapest, and still more in the south-eastern districts. The observations do not afford satisfactory information concerning the influence of elevation, but the effect of forests is clearly marked by an almost uniform decrease in all cases of 60 per cent., compared with the open country round about. A remarkable increase is noticed in towns—the evaporation in

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* Communicated by our Vienna correspondent, Dr. K. Peucker.

Vienna, for example, exceeding that in the immediate neighbourhood by as much as 5·9 inches. Perhaps greater reliance may be placed upon the classification of monthly curves of evaporation, inasmuch as these are, to a great extent, independent of the class of instrument used. Professor Penck divides Central Europe into districts according to the month of maximum evaporation:—Western North Germany, one maximum in May; Eastern North Germany, one maximum in June; Western South Germany, two maxima, May and July or August; German districts near the Alps, Bohemia, northern slopes of the Carpathians, one maximum in July. Here again the influence of forests is noticeable for its constancy—all the forest stations show a maximum in May. However valuable the evaporometer observations may be for many purposes, they undoubtedly fail to measure the amount of evaporation actually taking place from a land-surface, as has been shown in England by the employment of similar instruments on streams, on ponds, and on different classes of soil. In order to estimate the total aqueous vapour passing into the air over a large area Professor Penck falls back on the method of estimating the total rainfall, subtracting from it the total calculated discharge by rivers, and reckoning the difference as amount evaporated. For the north-west German river basin Professor Penck obtains an annual mean of 15¾ inches; on the Saale, 16¼ inches: and Dr. Ruvarac, in an as yet unpublished memoir, gives for the basin of the Elbe, in Bohemia, 19¾ inches nearly. These results, which are confirmed by similar investigations dealing with Upper Austria (Traun and Enns), show that the amount of evaporation is not wholly controlled by the air-temperature and prevailing winds, but also to some extent by the rainfall itself.

The Free Port of Copenhagen.—Particulars are given as to the new free port of Copenhagen in a recent report of Mr. C. S. Scott to the Foreign Office. The port has been established in conformity with a law passed in March, 1891, and within its boundaries no customs duties of any kind will henceforth be levied. The port dues for ships outward bound will also be abolished, while, instead of the port dues for foreign shipping entering the port, a tax on goods entering the customs harbour, both from the free port and elsewhere, in accordance with certain fixed regulations, will be levied. The works connected with the port have been carried out by the Harbour Board, and the necessary buildings have been erected by the Free Port Company, the receipts being derived from rent of buildings and land, payments for use of cranes, etc. The payments (quay money, pilotage, etc.) for a steamer of 1000 registered tons, inward bound with full cargo and outward bound with part cargo, are estimated at about £14 sterling.

ASIA.

Mr. Littledale on the Death of M. Dutreuil du Rhins.—We have received from Mr. St. George Littledale a letter, dated "Kashgar, January 10," giving an account of the death of M. Dutreuil du Rhins, similar to that given on the authority of Dr. Sven Hedin in the April number of the *Journal*. Mr. Littledale hoped to start in five or six days; he was awaiting the arrival of four Punjabis, who were being sent from India for his expedition.

AFRICA.

Dr. Donaldson Smith in Somaliland.—We have received the following note from Mr. Gillett, Dr. Donaldson Smith's companion on his expedition to Lake Rudolf: "As I have just returned from Dr. Donaldson Smith's expedition, it may be of interest to the Fellows of the Geographical Society to hear a few words about Dr. Smith. I left him at Bari, on the Webi Shebeli, just after he had received a fresh supply of cloth and money from the coast. The expedition was in an excellent condition for its long journey to Lake Rudolf; there were plenty of spare camels and any amount of trading goods, so that things ought to go along smoothly. I have been asked several times if there was not considerable danger of the Abyssinians interfering again; I think not. The line of march will be outside a radius of 200 miles from Ginmish, the Abyssinian fort, and, as Dr. Smith himself wrote to the papers, the Abyssinians would be coming into a hostile country, so that it is to be hoped that the expedition will prove most successful. Dr. Smith's last words to me were, he should make for the lake and return as quickly as possible, so that he may be looked for from three to six months from now. The only thing that I could see which might prove a difficulty was that the men were being attacked one by one by the fever that haunts that part of the Webi Shebeli, but, with the fresh supply of quinine which Dr. Smith also received from the coast, it is to be hoped he will succeed in getting the men on their legs again quickly. The crossing of the Webi by such a large caravan for the third time will probably contain many exciting adventures, as the river at that part swarms with crocodiles. As regards my journey home, I believe I came by the most direct road between Bari and Berbera, and one that up to the present has not been traversed by any other European as far as I can make out. It has many objections, however, one being the scarcity and foulness of the water. From the time of leaving the Webi till we reached the wells of Sehr, on the coast side of the Haud, two days from Berbera, the water stank. Another drawback was that there were very few people, the first villages that we met being only four days from Berbera in the middle of the Haud. The road, however, was excellent; except a very steep hill close to the Webi and the Terratto road near Mandarro, it was excellent going for the camels the whole way. There was very little game except near the Webi, where I saw quantities of water-buck, oryx, and Soemering gazelle at the same time. The country bore the ordinary Somali aspect—sand and thorn bushes, with open bunds or plains. The Tug Faf was the only important one we crossed, well clothed on its banks with a variety of vegetation. The wells between the Webi and the Haud bore Galla names, and were, I believe, made by a race prior to the Somals. The Haud on this road takes six long days to cross. The wells of Guorarti contained very little water, and some others about an hour further on were not much better. After leaving them there is no more water till the wells of Sehr are reached, where the water is excellent and abundant, the Tug being full of wells. The plain of Tugu, in the centre of the Haud, is a continuation of the plain of Silo, between Milmil and Hargeisa. The villages camped in it levy toll from passing native caravans. I accomplished the journey between the Webi Shebeli and Berbera in seventeen and a half days, but this, as my boys expressed it, is 'debbil marching;' but I firmly believe it to be the shortest and best road to the Webi."

Geographical Names in Somaliland.—In a notice published in the *Bollettino* of the Italian Geographical Society, objection is taken to Dr. Donaldson Smith's bestowing the names "Smith" and "Gillett" upon the Webi Shebeli and Web, not discovered by him (see *Geographical Journal*, v. p. 125). We quite agree with the writer of the notice, that the practice of giving European names to the rivers and lakes of Africa should be more honoured in the breach than the observance. If a European name at all is to be given to the first of the above-mentioned rivers, it surely is that of Haines; for, although a river flowing "at the back of Barawa" was heard of by the early Portuguese, it was Lieutenant Christopher who first reached its lower course in 1843, and who named it after his distinguished superior, Captain Haines of the Indian Navy.

German South-west Africa.—In the supplement to the *Deutsches Kolonial-blatt* for 1894, which consists of a series of memoirs on the various German colonies, the section dealing with South-west Africa contains papers by Drs.

Hindorf and Dove on the economic value and prospects of settlement in that protectorate. Having regard to the contradictory estimates hitherto formed on these subjects, an impartial study of the question, based on undoubted facts, such as the memoirs in question appear to be, will be found of much value. Both writers take a middle course between the extravagant hopes and undue depreciation which have been indulged in in various quarters, and show that the territory does undoubtedly possess resources which are worth developing. Dr. Hindorf was confirmed in this opinion by a tour through the Cape Colony, Orange Free State, and Transvaal, which led him to think that, on the whole, the conditions there were not a whit more favourable than those in the central part of the German territory. German South-west Africa is, he says, pre-eminently a country for cattle-rearing; and he makes some practical remarks on the conditions under which it may be carried out, and the possibility of introducing foreign species, such as the Angora goat, which he thinks might do well in suitable localities, and which in some ways has an advantage over the sheep. Dr. Dove discusses the question of the class of settlers most likely to succeed in the country, and comes to the conclusion that although to a limited extent small holdings for garden-cultivation, etc., might be successful, it is principally settlers possessed of a fair capital, who could start cattle-farms on a considerable scale, who are likely to do best. Both writers refer to the advantages which the country possesses over tropical colonies, from the fact that, owing to the purity and dryness of the air, Europeans can work in the open, and undergo physical exertions of all kinds without detriment to health. Among other points, Dr. Hindorf deals with the question of communications, and considers that although the practice of agriculture on a large scale in the fertile districts of the interior would necessitate the construction of a railway, the present means are sufficiently good to allow of settlement of a kind adapted to the general conditions of the country.

AMERICA.

Northern Canada.—Some very interesting particulars of the conditions of animal life in the extreme north of North America are given in the January number of the *American Naturalist*, where the recent journeys of Mr. Frank Russell, of the State University of Ohio, are briefly described. Mr. Russell spent the autumn and winter of 1892 near the north end of Lake Winnipeg, collecting specimens and studying the Indians. In May, 1893, he went in a Hudson Bay Company's boat to Fort Chippewayan, on Lake Athabasca; and in July reached Fort Rae, on the north-western extremity of the Great Slave Lake, which was his base until May, 1894. From this centre he made numerous trips into the Barren Grounds. During the winter many caribou were secured, but all attempts to find the wood-buffalo failed, although one or two specimens were reported by Indians; Mr. Russell is inclined to think that this animal has been very nearly exterminated. In the spring of 1894 he made his way with the Indians, though much against their will, to the Musk Ox hills, near Bathurst Inlet, in order to shoot musk-oxen, following presumably the route taken by Mr. Warburton Pike. Then, returning to Fort Rae, he went round the north coast of Great Slave lake westward to Fort Providence, finding that the map of that part of the lake was very defective. Proceeding in a steamer down the Mackenzie river for some distance, and then in company with Comte de Sainville, he continued in canoes to the Arctic Sea, and navigated these light craft through the ice-floes to Herschell Island, where the American whaling fleet was found. After spending two months in collecting, Mr. Russell and his companion returned in the whaler *Jeanette* by Bering Strait, and reached San Francisco on October 27. This journey of solitary scientific exploration lasted two years, and the brief record of it which we have seen bears abundant evidence of the perseverance and success of the explorer.

Lake Superior.—In the note in our February number of this volume, p. 173, on the new Sailing Directions for Lake Superior, the alleged instances of careless revision which are cited are examples of hasty reading on the part of the compiler of the note. The sentence in the 'Sailing Directions' about total depth is correctly expressed, and the Canadian canal is noticed, although not under a special heading. We take the first opportunity to correct the mistaken criticism.

Maps of the District of Columbia.—In the *National Geographic Magazine* for November, 1894, Mr. Marcus Baker gives an interesting account of the various surveys which have been made of the Federal district in which the city of Washington is situated. This was planned in 1790 as a square 10 miles in the side, with the angles directed to the cardinal points; and in the two following years it was laid out, a lane 40 feet wide cut through the forests, and inscribed stones set up at intervals of a mile. On the inner side each milestone bore the words "Jurisdiction of the United States;" on the outer side the name of the bordering state, "Maryland," or "Virginia;" on the third side the date of erection, and on the fourth the variation of the compass, which now forms the earliest record of magnetic variation in the district. The exact triangulations recently made by the Coast and Geodetic Survey show that the original surveyors did not make a very good approximation to the square they tried to mark out, for all the sides are longer than 10 miles, the north-western being 63 and the south-eastern 70·5 feet in excess, while the south-western and north-eastern sides are 230·6 and 263·1 feet respectively too long. The mileposts also were somewhat irregularly placed. An account is given of the laying out of the first meridian, which should have formed the diagonal of the square, and which is almost 77° W. of Greenwich; and a number of interesting historical notes as to early and recent maps are supplied. A German draughtsman named Boschke, who was in the Coast Survey Office before the Civil War, made an elaborate survey at his own expense with the view of selling it to the Government; but the speculation was disastrous, as it led, in the first instance, to his dismissal for neglect of official duty, and, on the outbreak of the war, the Government seized the plates of the map, which had just been engraved, and afterwards paid a very small sum in compensation. The Geological Survey topographical map of the district of Columbia is on the scale of approximately 1 inch to 1 mile, and is contoured at 20-feet intervals. The Coast and Geodetic Survey map, not yet issued, is completed on the scale of 13 inches to 1 mile, in 100 sheets.

The United States and Mexican Boundary.—This boundary, which was marked under the treaty of 1853 by 52 monuments, was in 1891 re-marked by a joint commission of the two nations, and an account of the work, as summarized by Mr. A. T. Mosman, one of the U. S. Commissioners, at a meeting of the National Geographical Society in Washington, appears in *Science* for March 29 last. It had been agreed that any of the old monuments recovered should still be utilized, and out of the total of 52, 38 were found standing (including all those at which the line changed direction), but were not always accurately placed, so that the boundary follows a broken line in places. A great number of new monuments were erected, the rule being that a greater space than 5 miles should in no case intervene between them. Between El Paso on the Rio Grande and the Pacific the number is now 258. The advantages of modern methods, especially the determination of longitudes by telegraphy, was strikingly shown, though the old work (by Emory) proved to be remarkably good for the method then employed. For the latitudes (as was originally intended for the longitudes also) independent determinations were made by the commissioners of the two nations, and the results agreed very satisfactorily, the maximum difference in the location of the monuments amounting to only 1·8 m., and this in a very difficult country. The determination of intermediate points by the *stadia* also proved very satisfactory, the difference in one line of 45 miles measured over rolling sandhills amounting to one part in 1800 only.

POLAR REGIONS.

Peary's Visit to the Cape York Ironstone.—The existence of a mass of meteoric iron near Cape York, in North-West Greenland, from which the Eskimo have been accustomed to detach fragments for the manufacture of rough knife-blades, has been known since the date of Sir John Ross's expedition in 1818; but until Lieut. Peary's visit to the spot in May and June of last year, no traveller had succeeded in discovering it. The enforced early return of his expedition of 1893-94 to head-quarters, gave him the wished-for opportunity of visiting Cape York, and an account of the trip is to be found in the *Bulletin* of the American Geographical Society (vol. 26, No. 4). From Inglefield Gulf Lieut. Peary and his companion, Mr. H. J. Lee, proceeded on sledges along the coast, doubling Capes Parry, Atholl, York, etc., and experiencing great difficulties from constant snow-storms and the daily enlarging cracks in the ice. At last the head of the eastern arm of the bay east of Cape York was reached, and a single fine clear day facilitated the search for the stone, which was laid bare by the Eskimo guide by excavation in the covering of snow. It is of a rounded trapezoidal shape, with a maximum length of 4 feet 6 inches, the highest part projecting 15 inches above the ground. Its surface is dark-brown rust colour, interspersed with small greenish pits. It is apparently a mass of pure iron, easily cut with a knife, and wherever scraped presents a bright silvery lustre. The ground near was covered with fragments of blue trap brought by the natives for the purpose of detaching scales of the metal. A second stone about 7 miles distant was searched for, but not discovered, and a third also is said to exist to the eastward. On the return journey, the increase in the amount of open water necessitated frequent deviations from the coast-line in order to pass the various promontories, and numerous glaciers were crossed, one of which, the Petowick glacier, close to Cape Dudley Digges, is thought by Lieut. Peary to offer exceptional advantages for the study of glacial characteristics in those latitudes. On the outward journey the glaciers of Barden Bay, at the entrance to Whale Sound, were found to have decidedly changed since Hayes' visit. The cliffs along a considerable part of the shore were found swarming with bird life—little auks, loons, kittiwake gulls, etc.—in numbers which appeared almost inconceivable.

"An Artistic Expedition to the North Pole."—Mr. F. W. Stokes writes from Philadelphia to point out that Herr Julius von Payer will not be the first who has visited the Polar Regions for artistic purposes. Mr. Stokes has done so himself, and so have several others whose names could be mentioned. But, so far as we know, Herr von Payer will be the first to fit out a great expedition for the purpose of spending a whole year or more in a high latitude with a view to the artistic study of Arctic conditions in all of their many aspects.

Antarctic Exploration.—Baron Nordenskjold, writing to a correspondent, states that his nephew, M. Otto Nordenskjold, intends to take part in a private expedition on a small scale to explore Antarctic lands in the course of the present year. The expedition will probably visit Tierra del Fuego.

GENERAL.

The Russian Geographical Society's Yearly Report for 1894.—At the meeting of the Russian Geographical Society, January 30, the yearly report of the

Society was read, and the medals awarded were distributed. It appears that three expeditions were at work during the past year in Central Asia, under MM. Obrucheff, Roborovsky, and Berezovsky. V. A. Obrucheff is already back from his two years' journey, after having performed a most brilliant exploration of the borderlands of Tibet and of Eastern Tian Shan. Altogether, he has covered about 9400 miles, and the result is, that we now have for the first time a geological knowledge of the whole region, while a great deal of most valuable and varied information has been collected at the same time. To the highest range, discovered by him, the Society has decided to give the name of "Alexander III.'s Range." The second expedition, under Roborovsky, has explored the oasis of the Luk-chun depression, which is from 330 to 500 feet below the level of the ocean. In order to determine its altitude with more exactitude, a meteorological station has been established there, and a careful survey and levelling of the depression itself has been made, from which it appears that it has a length of nearly 100 miles, and a width of about 50 miles. From Luk-chun the expedition proceeded to Sa-chau, and made interesting observations and surveys in the desert situated on the south of Luk-chun, where no less than six wild camels were obtained. Excursions were also made from Sa-chau to the Nanshan highlands, and extensive surveys were made in that region as well. Last spring the expedition left the Chinese town for the explorations in the east of Koko-nor. M. M. Berezovsky has worked, during the past year, in the south-western provinces of China, and last autumn he began his return journey to Russia. In Turkestan and the Transcaspian territory, the well-known French geodesist, M. Desforges, has made, at the invitation of the Russian Geodetical Bureau, pendulum observations, with the view of establishing a connection of the French with the Russian measurements. He has completed a series of measurements with his pendulum at Pulkova, Tashkent, Bokhara, Uzun-ada, and Tiflis. In the far north of Siberia, an expedition which was sent out by the Hydrographical Department under A. I. Vilkitsky, has made surveys in the Yenisei Bay, and along the coast towards the Gulf of Ob, as well as up the lower Yenisei. Pendulum measurements have been made, moreover, by M. Vilkitsky at Yeniseisk, Golchikha, the mouth of Yenisei Bay, and Port Dickson, in 73° N. latitude. Besides, Baron Sterneck, who has visited Russia for the purpose of connecting the Austrian pendulum observations with the Russian ones, has made measurements at Pulkova and Moscow; while Dr. Fritsche made about 120 magnetical measurements, for a detailed magnetical survey of the region where the well-known pendulum anomaly occurs in the neighbourhoods of Byelgorod, in the government of Kursk. In the south, an expedition of the Society, consisting of four explorers, was at work in the Sea of Marmora, for a careful exploration of the hydrology and animal life of that interesting basin. Several expeditions were at work within Russia itself, the chief of them being under Th. M. Istomin, for collecting the music and the words of popular songs. Three aëronautical ascensions were made in connection with the German aëronautical Society for the exploration of the higher regions of the atmosphere; and E. S. Markoff has explored and made soundings of Lake Gokcha in Caucasus. The report finally mentions the expedition undertaken by M. Leontieff to Africa, under the patronage of the Geographical Society. At the same meeting the following medals were awarded: The great Constantine medal, to S. N. Nikitin, for his many and varied works on the geology of Russia; the Count Lütke medal, to Colonel P. K. Zalessky, for his many years' geodetical work in Turkestan; the great gold medal of the Society, which was awarded this year by the Section of Statistics, to N. A. Karysheff, the author of an excellent volume on the land rented by the peasants in addition to their allotments (vol. ii. of the 'Results of the Economical Study of Russian according to the Data afforded by the Zemstvos

Statistics'); the Prjevalsky premium of 600 roubles, to V. A. Obrucheff for his journeys in Central Asia; small gold medals, to the French geodesist, M. Desforges, and the Austrian geodesist, Baron Sterneck, for their pendulum observations in Russia, and to M. Sieroszevski, for his manuscript work on the Yakuts; the great silver Prjevalsky medal, to Baron Toll and Lieutenant Shileiko, for their explorations in Arctic Siberia; and eleven silver medals, to eleven different persons for various minor works. Nearly £2500 have been spent during the past year for scientific expeditions, and the capital of the Society amounted on December 1 to £13,625.

OBITUARY.

Major-General Sir Henry Creswicke Rawlinson, Bart., G.C.B., etc.

By Major-General Sir FREDERIC J. GOLDSMID, K.C.S.I., C.B.

THE remark that the death of this distinguished soldier, scholar, and diplomatist leaves a gap which cannot easily be filled, may sound like a repeated platitude, but is nevertheless a plain truth, whether applied to military, learned, or political circles. When the remains of the deceased officer were laid in the Brookwood cemetery, early in the past month, how many mourners must have felt that a mine of lore and learning was thenceforth lost to the ken of his surviving fellows, and that a rare and high idiosyncrasy had passed away from man's nether world which it was enabled, from its exceptional character, to instruct and influence! It is here proposed to sketch, briefly and in outline, a career already doubtless in some shape recalled, by the circumstance of its close, to numbers of admirers both at home and abroad. Seeking in the main to summarize, we shall venture to pause upon two or three salient points.

Henry Rawlinson, son of Mr. Abram Rawlinson, of Chadlington Park, Oxford, and his wife, a Gloucestershire lady, was born at the family residence on April 5, 1810. Educated at Wrington in Somersetshire, and Ealing in Middlesex, he was nominated to an Indian cadetship, and, in accordance with his appointment to Western India, he proceeded by ship to Bombay in 1827, a fellow-passenger with Sir John Malcolm, the new Presidency Governor. A choicer example, or fitter association for a cadet about to enter on his professional career, could not well be imagined, and its effect must have been more than transitory. One of its results, in the present case, may well have been an early application to the study of native languages, in the acquirement of which young Rawlinson showed such singular aptitude, that he obtained the interpretership of his regiment in less than a year after joining. Five years' service with the corps had constituted him a smart regimental officer, a bold, good rider, and withal a clever linguist—one, indeed, available for any special, detached duty, such as the disturbed state of Central Asian politics and the incomplete expansion of our Northern Indian frontier might demand at the hands of Indian officers. It was thus quite in the natural course of things that he should have been selected as one of the new band of instructors whom Lord William Bentinck thought expedient to send to Persia for organizing the Shah's army. The nature, together with the practical uses of the work he was called upon to do, and the mode in which he performed it, may be inferred from these, his own comments on a lecture * by the present writer, at which he did the lecturer the honour to preside, in 1879:—

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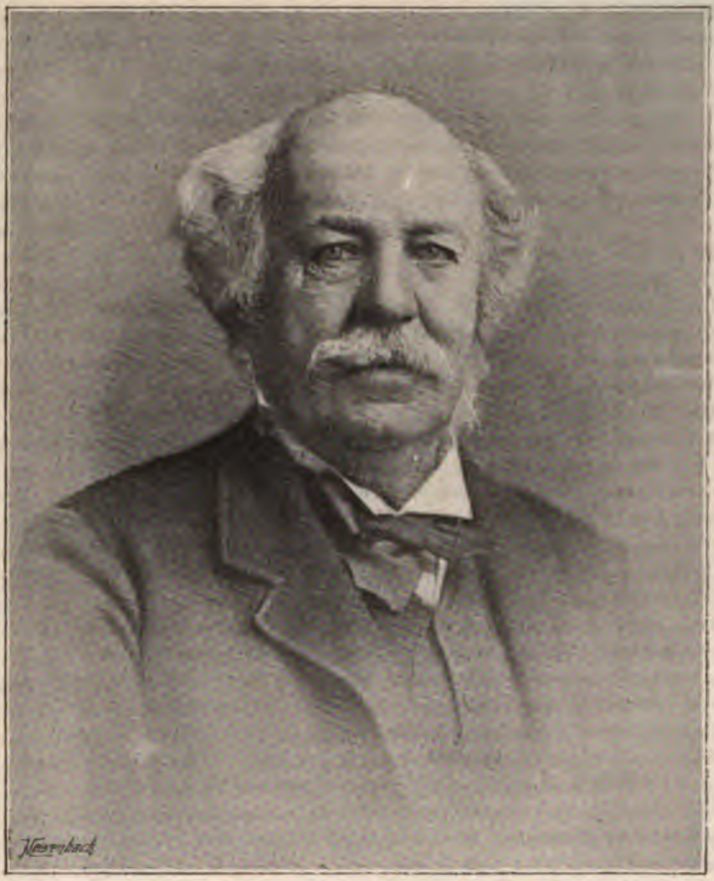
* "Persia and its Military Resources," at the Royal United Service Institution, March 7, 1879.



SIR HENRY C. RAWLINSON, BART.
(*From a Photograph by Mayall.*)

"It is now forty-five years since I first went to Persia, where I served for five years in the Shah's army, and of course acquired a good practical acquaintance with the country, and especially with its military resources. . . . The particular occasion which gave me such a good opportunity of testing the value of the military resources of Persia was my being deputed to one of the frontier provinces for the purpose of raising three or four infantry regiments from amongst the tribes of the neighbourhood. I had to work *ab initio;* from the first enlisting of the men in forming them into squads, companies and regiments, and ultimately bringing the brigade up to head-quarters to join the army of the Shah. . . . The physique of the men is admirable, and their power of endurance is great; the absence, again, of all habits of intemperance is very important, while the general intelligence and personal courage of the men is beyond all praise. . . . If the Persian material . . . were placed at the disposal of a European power who would encourage and take care of the men, and develop their military instincts, a fine working army, very superior, in my opinion, to anything that Turkey could produce, might be obtained in a very short period of time. The tribes, indeed, on the western frontier, those inhabiting the range which runs from Ararat to Shiraz, are the very *beau ideal* of military material, the men being athletic, strong, hardy, and active."

Colonel Sheil, an excellent authority, bears testimony * to the high reputation of the two regiments formed from "the two famous Lek tribes of Kalhor and Gooran, which were at one time commanded by Sir Henry Rawlinson." But Kaye relates, in a footnote to his 'War in Afghanistan,' another passage in the young officer's early experiences of Persia, which will more directly raise the estimate of his personal qualifications as a soldier. Towards the close of 1837, when Muhammad Shah and his troops were hovering about Herat, Sir John McNeill had occasion to despatch Major Rawlinson from Tehran, to transact some urgent business in the royal camp. On the last morning of his ride, which is described as one of "more than 700 miles in a week," he chanced to come across Vickovich, the mysterious agent often mentioned in Burnes's Kabul despatches. The historian's romantic story need not here be repeated. Suffice it to say that Rawlinson's sense of duty prompted him to hurry back and make verbal report of the occurrence to the Envoy, which he did in "a second ride of 750 miles in 150 successive hours."

To the geographical results of the military mission we shall revert later on. Its work in Persia terminated when, in 1838, the British Envoy broke off diplomatic relations with the Shah's government, and ordered the officers who had been lent to it by the Governor-General to proceed to Baghdad *en route* to India. Arrived in India, Rawlinson was at once in request, and his services were utilized for the campaign in Afghanistan. Travelling through Sind to Kandahar, he proceeded, agreeably to instructions, to join Sir William MacNaghten at Kabul. From that city, after narrowly missing association with Stoddart and Conolly in the ill-fated mission to Bukhára, he was recalled south to fill the honourable and responsible post of political agent at Kandahar. The date of this appointment is stated in the official record to be October, 1840, and we find on the same authority that he returned to India "with the avenging army," through Kabul and the Punjab, in 1842.

Major Rawlinson's tenure of office at Kandahar involved no sinecure, for the daily occurring events were such as to tax his powers to the utmost. Fitly to discharge the responsible duties assigned to him, he required both moral and physical courage to deal with present emergencies and complications, and forethought in anticipating possible results. With the Duráni chiefs, whose well-being we had seemed to promote by our support of Shah Shirja, he had an especially difficult game to play. At one time his part was to temporize; at another, to be openly hostile. Always on the alert, it was incumbent on him also continually to advise and warn his absent superior of existing and coming danger, particulars of which might chance to come within his own range of observation. In a military capacity, he made it his duty to help his comrades in perfecting the inner defences of the town they occupied, or to accompany the troops when engaged with an enemy without the walls. He was, moreover, expected to keep an account of the local revenue, and report upon the expenditure of a court not less troublesome because it was almost nominal. Fortunately for him, he was associated with a commander of high soldierly qualities; so that the coupling of Nott's name with his own, in reference to this critical epoch, is a practice in full acordance with historical tradition, and otherwise familiar as a "household word." The views of each of the two distinguished officers, on receiving orders to evacuate Kandahar, were characteristically expressed in a correspondence dated February 1, 1842. They will be found at pp. 244, 245, vol. i., of the biography of Sir James Outram by the present writer, to whom Sir Henry Rawlinson had written, "You can print the extract from my letter to Nott, if you think it of any public interest."

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* Lady Sheil's 'Life and Manners in Persia.' Additional notes, p. 383 (Murray: 1886).

At the time of Rawlinson's return from Afghanistan, his enhanced reputation as a political and military officer made further advancement in his case a certainty; and in 1843, after some months had been devoted to the adjustment of accounts for which the financial requirements of his position in Kandahar had rendered him responsible, he was appointed political agent at Baghdad, or, in the words of the Foreign Office List, "Political Agent for the East India Company in Turkish Arabia." To this was added the post of Consul in 1844, during which year he was made a C.B., and granted Her Majesty's license to accept and wear the insignia of the Persian Lion and Sun, first class, together with those of the Afghan order of the Duráni Empire, third class. Promoted to Consul-General at Baghdad in 1851, he resigned the appointment and returned home in 1855, retaining in England the honorary rank of Lieutenant-Colonel which had been accorded him within the Ottoman dominions. He was made a K.C.B. in 1856, the year of his nomination to be a crown director of the East India Company, and, moreover, of his retirement from the service. In 1858 he was made a member of the new Indian Council, and in the following year appointed Envoy and Minister to Persia (with local rank as Major-General); but though a *persona grata* at Tehran, he had sound and sufficient reasons for resigning his high position there, and returned home after a few months.

Henceforth Sir Henry Rawlinson became, as it were, an institution in his own country; a leader of Central Asian politicians; a Mentor to Oriental students; a referee on Persian questions to successive administrations, whether Conservative or Liberal. His home work was mainly to turn to account the experiences of his Eastern career of nearly thirty years for the benefit of his fellows, in no small degree across the Channel as at home. In this sense, his teaching may be considered of a twofold character—political and scientific. The former was imparted in speeches before the House of Commons; addresses to societies; and incidental utterances when he happened to be chairman, or one of an audience, at public meetings of a miscellaneous kind. It was also conveyed in writings pregnant with meaning and eloquent in their earnestness and *connaissance de cause*. His 'England and Russia in the East,' described as "a series of papers on the political and geographical condition of Central Asia," published in 1875, is a marvel of wisdom and profundity in respect of theory and statement of facts. Much of its counsel, however, may be judged too advanced for many even of those who have implicit faith in the author's premisses. Indeed, it may be a question whether the twenty years which have passed since the compilation first appeared did not, to the compiler's own mind, somewhat weaken the force of one or more of his arguments. In any case, the book supplies an invaluable study for all aspirants in Oriental diplomacy. To supplement it with some sort of *résumé* of events which have followed the period of its publication might be wise, but, whatever its bearing on particular details, the precaution need not lessen the general prestige of the author. Independently, too, of his own separate writings, the annotations which he supplied, and which gave lustre to contemporary works—varying in character from the 'Herodotus' of his brother, Canon Rawlinson, to the 'Caravan Journeys' of the *Chasseur d'Afrique*, Ferrier—speak volumes for his erudition and scholarship. As to Sir Henry's scientific teaching, the subject must be subdivided under two heads—linguistic and geographical. To the former we can make little more than passing allusion at the present time, for the question involved is too vast for cursory treatment. But it includes the great triumph of his genius and intelligent perseverance, the labour of his love and, in a great measure, of his life. Breaking ground in 1835, when drill-instructor to Persian soldiers, with the rock-tablets of Behistun (called by Joachim Menant *besitoun*—pillarless), and continuing the decipherment of arrow-headed inscriptions throughout the tenure of his office in Turkish Arabia—a labour supplemented by excavations and archæological research—we find him, for a long series of after-years, presenting contribution after contribution to the literature of Cuneiform through the publications of learned societies. Among his more popular writings, for instance, when he was no longer trammelled with the responsibilities of political employment, may be cited those which represent his share in the six volumes of 'Cuneiform Inscriptions,' prepared for the trustees of the British Museum. Among his less-known papers are "Notes on Tablets containing Bilingual Legends, Assyrian and Phœnician," published in the *Journal of the Royal Asiatic Society* for January, 1864; and "Notes on a newly discovered Clay Cylinder of Cyrus the Great," in the *Journal* of the same Society for January, 1880.* But the number of similar contributions between the two cited years is legion.

Let us now glance at those labours which more immediately concern our Society.

Any attempt in these pages to render an account of Sir Henry Rawlinson's services to geography, by presenting a mere *résumé* of his relations with the Society of which this *Journal* is the organ, were indeed trouble in vain. No statement of the kind could be complete without an exposition of the value of his work; and the accomplishment of such a task would involve a political retrospect as well as a combination of geographical details, each of which would supply material for a goodly-sized volume. But although the unadorned record may be insufficient to satisfy the requirements of critics and connoisseurs, it may possess its usefulness as an obituary notice, in which sense it is now put forward. At the period of his decease, Rawlinson's name had been borne on the list of Fellows for more than half a century, for he had been elected in 1844, and five years before his election he had received the Founder's Medal for "great services to geography" rendered in Persia. These were exemplified in the circumstance that, from 1833 to 1839, he had "explored, with great zeal, perseverance, and industry, the provinces of Luristan,

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* Of the small circle gathered in Albemarle Street when this paper was read, some will doubtless remember the ease and earnestness with which its author, cylinder in hand, expounded his theories. Few, if any, of those present could gainsay, nor did any attempt to disprove, his arguments; yet questions such as these can hardly fail to provoke the criticism of scholars.

Khuzistan, and Azerbaijan, and the mountain ranges which divide the basin of the Tigris from the elevated plains of Central Persia."* The historical and archæological research displayed on this occasion by a young officer of the Indian army, otherwise conspicuous for professional ability, were so remarkable, that his qualifications as an explorer were at once generally recognized.

During the early years of his connection, however, with the Royal Geographical Society, absence from England necessarily checked that personal intercourse with its officers and participation in the administration of its affairs, from which it derived so much benefit at a later period. Elected to its Council in 1850, and for the years 1851, '57, '58, '61, '62, '63, '68, he was a Vice-President from 1864 to 1867 inclusive, and for 1869 and 1870; while in 1871 and the following year he was elected President, an office which he again held in 1874 and 1875, having been a Vice-President in 1873. From 1876 to his retirement in 1893, he was borne on the roll of Vice-Presidents or Members of Council. We have shown that his name had been included in the list of our Fellows for more than fifty years; it may, therefore, be added that it was further included in the list of our administrators for nearly four-fifths of that period.

Among the more recent papers which he has contributed to the Society's *Journal* or *Proceedings*, may be mentioned the monograph on the Oxus † and the exhaustive notes on Sīstān,‡ as indicative of his unfailing acquaintance with places of which he had made a careful study, but had had no actual personal experience on the spot. But his treatment of the many questions which arose during his occupation of the President's chair showed that he could give his mind to the world's regions generally, irrespective of Persia and Central Asia; and he proved himself a good, all-round bearer of office. At times he may have shown an inclination towards political discussion with regard to certain subjects of the day, which might come before the evening meetings, and on which he held strong opinions. But this was only natural; and he never encouraged any determined infraction of the wholesome rules laid down for his guidance on such occasions. Among the late Lord Strangford's collected writings is an amusing notice of a meeting in February, 1868, under the presidency of Sir Roderick Murchison, when Sir Stafford Northcote (since Lord Iddesleigh), then Minister for India, who was present, was led into rising from his seat to repudiate the projected annexation of an Abyssinian port, which charge was incidentally thrown out in a discussion between Sir Henry Rawlinson and Sir Samuel Baker. But Sir Henry's *strong* point was Central Asia; and herein we may quote more fully the same able critic, Lord Strangford, referring to a former *séance* of the Society: "The extreme and, indeed, unique value of every word which falls from Sir Henry upon any subject connected with Central and Western Asiatic research is, perhaps, less appreciated here than it is on the Continent and in Russia, or than it will be by our children; but what we wish here chiefly to lay stress upon is the direct practice, tendency, and bearing with which he applies his enormous acquired and theoretical lore each time that he addresses the popular meetings of the Society."

Sir Henry Rawlinson, like his colleague in the Council of India—the late Sir Henry Yule—had much knowledge of the works of Arab geographers; and, in the recently issued supplementary catalogue of Arabian manuscripts in the British Museum, § there is included a private collection of seventy-five volumes purchased from his library in 1877. Among these will be found the first, second, and last volume, as also detached portions of the *Mu'jam al Buldān*, or geographical dictionary of Yāķūt al Hamāwi, together with the same author's dictionary of geographical homonyms. Yāķūt's abridged dictionary may be added, but Sir Henry warns the intending inquirer into its contents that the transcript has been "execrably performed." A work on general geography by Ibn Saīd, written in the thirteenth century, will also be found in the aforesaid category. These copies were made expressly for the collector at Baghdad, Mosul, and Tehran, at various dates between 1838 and 1854. Of Rawlinson's Persian manuscripts in the British Museum, Dr. Rieu pronounces two geographical works to be among the most valuable. These are "the first, and only extant, volume of the geography of Hāfiz Abrū, written for Shāhrukh A.H. 820, and containing a full and important History of Khorasan," and "a geographical work, with maps, translated for the Amīr of Jand about A.H. 616, from an Arabic original ascribed to Jaihāni," stated to be "a modern transcript from an old and fine manuscript obtained by Sir Henry at Ispahān in 1837, and lost in the troubles of Afghanistan."

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* 'The Fifty Years' Work of the Royal Geog. Society' (Murray: 1881), p. 54.

† *Journal of the R.G.S.*, vol. xlii. p. 482.

‡ *Ibid.*, vol. xliii., 1873, p. 272.

§ Printed by order of the Trustees, 1894.

To the honours and distinctions awarded to Rawlinson since 1859, and in addition to those already enumerated, we find a record of the following:—

He is a knight of the Prussian Order of Merit; associate member of the French Institute; hon. member of the Academy at Munich; Hon. D.C.L. Oxford, Hon. LL.D. Cambridge and Edinburgh; D.L. of London; he was made a G.C.B. in 1889, and a Baronet in 1891. He had been member for Reigate in 1858, and sat for Frome in 1865 to 1868. For many years director of the Royal Asiatic Society; he was also a Trustee of the British Museum, F.R.S., and Vice-President of the Royal Society of Literature. He, moreover, attended upon the Shah of Persia on the part of the British Government during His Majesty's visit to England in 1873 and 1879. He married in 1862 Louisa, daughter of the late Henry Seymour, Esq., of Knoyle, Wilts, who died in 1889; and the elder of his two sons, in Her Majesty's army, now succeeds to the baronetcy.

Sir Henry Rawlinson, notwithstanding an occasional *brusquerie* of manner and reserve, was a kindly, genial, and sincere adviser and friend. His hospitality as President of the Geographical or Asiatic Society, or as a mere mover in London society, was large; and at his dinner and receptions, in Lady Rawlinson's lifetime, were met together the most noted of travellers, *savants*, and diplomatists of our own country or from abroad. It has been truly said that, in this exceptionally distinguished officer, "there passed away the most commanding, and certainly the best-known, figure among English Orientalists." * May we not add that his fine presence and practical usefulness will be equally missed among statesmen and geographers?

Admiral Lord Alcester.

By the PRESIDENT.

Admiral Lord Alcester's death, which took place on March 30, was not wholly unexpected. He had been in failing health for some time. In this place it is unnecessary to record his naval services, which are well known and are matters of history. We would rather turn to the geographical phase of our deceased associate's character. Beauchamp Seymour left Eton to enter the navy in 1834, and ten years afterwards he crossed the Pacific from India to South America in the *Thalia*, and joined the *Collingwood* at Valparaiso, as flag-lieutenant to his uncle,

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* *Athenæum*, March 9, 1895.

Sir George Seymour. One whose intimacy with him commenced over fifty years ago, would gratefully recall some reminiscences of kindnesses received from Sir George's very efficient flag-lieutenant, because they illustrate, in some measure, that side of his mind which is most interesting to readers of this *Journal*. Like Dampier, Sherard Osborn, and others of our best naval writers, Beauchamp Seymour was a very diligent keeper of his journal—not mere jottings and memoranda, but a valuable record on a carefully thought out plan, first with reference to matters that might be useful from a service point of view, and next as a repository of geographical information. Sir George had brought to sea an excellent library of works relating to the Pacific, which were in constant use by his nephew on board the *Collingwood*. In the foremost cabin, on the starboard side of the main deck, at a little flap table against the gun-carriage, his writing was done, while books of reference were strewn over the side tackle. But the table was not for his use alone. Young friends from the gun-room were allowed to come and read there, and take notes; while Beauchamp, in his off-hand hearty way, pointed out what it was useful to remember in the voyages of old navigators, and explained the importance of comparing what various writers said on a given point, and of forming a judgment from conflicting statements. It was due to the trouble he so kindly took that one, at least, of the frequenters of that cabin first acquired his taste for critical geography. There were occasions, too, when Beauchamp Seymour gave his young companions special lessons on shore; explaining the signs for judging of the shoalness of water in rivers, of the existence of fords, and other matters of a like kind. On a well-remembered occasion when, after a long struggle through dense forest near San Blas, on the coast of Mexico, he was pointing out a ford over the Rio Grande de Santiago, a horseman, followed by a servant and spare horses, rode up to the opposite bank and took the ford. It was his brother Charles, who had ridden across Mexico to visit his relatives. He was afterwards killed at Inkermann.

Beauchamp Seymour had never known his uncle Sir George very intimately until he joined the *Collingwood* in December, 1844. But after a few months the admiral treated him with entire confidence in public matters, and kept him completely *au fait* of all the questions with which he had to deal. They were very far from being unimportant questions. Those were the days of the "Pritchard" embroglio with France, of the negotiations respecting the Society Islands, of the Oregon disputed boundary, and of the American seizure of California. There can be no doubt that Beauchamp Seymour derived great benefit, as regards his after-career, from his constant habit of keeping a journal, and from his diplomatic training under his uncle.

Sir George Seymour was a Fellow of this Society from 1855 until his death in 1870. His nephew, Sir Beauchamp Seymour, joined us in 1872. He was also a member of the Geographical Club, and took special interest in our proceedings during the time that he was Private Secretary to Mr. Childers, and afterwards a Lord of the Admiralty. His shipmates followed his brilliant career with affectionate interest; and it will always be a pleasant memory for one of them, who has much reason never to forget the kindness and friendship of Beauchamp Seymour in years now long gone by, that Lord Alcester should have supported him, and have recalled many half-forgotten incidents of a very happy past, at our Anniversary Dinner last year.

Sir Edward H. Bunbury, Bart.

By the PRESIDENT.

Sir Edward Bunbury's death, in a ripe old age, has removed from among us the most learned and scholarly of our exponents of ancient geography. He was the second son of General Sir Henry Bunbury, of Mildenhall and Barton in Suffolk, and his mother was a niece of the great statesman Charles James Fox. Sir Henry was educated at Westminster School, where he was the schoolfellow of Lord Lansdowne, Charles Wynn, Ridley Colborne, and the poet Southey; as was his elder brother Charles, the "Master Bunbury" of Sir Joshua's charming picture. But Sir Henry resolved to educate his sons at home. The two elder brothers, Charles and Edward, studied together. The eldest was born in 1809, and, his studies having been interrupted by illness, he was practically in the same stage of advancement in his lessons as his next brother. He was the late amiable and learned Sir Charles Bunbury, eminent as a botanist, and also a good geologist, who died in 1886. Edward was born on July 8, 1811, and the whole business of educating the two boys was undertaken by their parents, a duty discharged with assiduous, conscientious, and loving care. The regular lessons were never long, but much was taught and learned at other times by cheerful conversation, by readings aloud, by encouraging and directing their tastes, and by stimulating and guiding their desire of knowledge. In 1827 they were taken to Italy, where their minds were enlarged by travel, and by the study of the masterpieces of art. At their own home at Barton their artistic taste continued to be trained by the constant sight of many fine portraits and other works of art, including the Ambrosio Spinola of Rubens, and pictures by Luini, Guercino, Salvator Rosa, Domenichino, Vandyck, Ruysdael, Van der Helst, Reynolds, and Romney.

In this instance a home education was a remarkable success, and it would have been difficult to find better-informed men and more agreeable companions than were Sir Charles Bunbury and his brother Edward. The latter was Senior Classic at Cambridge and Chancellor's Medallist in 1833. He was called to the Bar in 1841, and was Liberal member for Bury St. Edmunds from 1847 to 1852. But his taste for classical learning never left him, and he was a diligent and indefatigable student through life. His numerous visits to France and Italy, where he enjoyed the *entrée* to the best and most distinguished society, gave life and interest to his studies, and no one was more ready to impart his knowledge to others through the medium of pleasant conversation. He was exceedingly fond of society, and in his later years he was a constant frequenter of the Athenæum, where he enjoyed meeting and conversing with his numerous friends.

The principal results of Edward Bunbury's studies, of a permanent character, are to be found in the numerous exhaustive articles scattered through Smith's dictionary of Greek and Roman geography, as well as in the dictionary of mythology and biography. They are models of accuracy and of exhaustive erudition; and Professor Freeman used to say of them that when he saw the initials "E. H. B." he knew that the information would be correct, and that further research was unnecessary.

But the great work of Edward Bunbury's life was his 'History of Ancient Geography,' which was published in 1879. There was no historical review of this important subject as a whole, in the English language, until the appearance of Edward Bunbury's work, which was based on the sound principle of a careful and critical examination of the ancient authorities, while availing himself to the fullest extent of the assistance to be derived from modern travellers and geographers. The great importance of this work was felt so strongly by our Council, that a resolution was presented to Mr. Bunbury, at the anniversary meeting of 1880, recording the Council's "appreciation of his literary labours in the production of a work of the highest value, combining accurate scholarship with large observation, and displaying a thorough acquaintance with modern geographical discovery as well as with classical literature." Edward Bunbury had become a Fellow of the

Society in 1839, and served on the Council in 1846–47. In replying to the letter, enclosing the resolution, he expressed his "gratification that, after having been so many years a Fellow of the Society, he should, before the close of his career, be found worthy of this public testimonial that he had been able to do something towards the advancement of that science which had been an object of interest to him from his earliest youth." Edward Bunbury was not merely a geographer and a classical scholar, he was also an accomplished numismatist, and his lodgings in St. James's Street contained a select collection of valuable coins.

On the death of his brother, Sir Charles Bunbury, Sir Edward succeeded as ninth baronet in 1886, when it became necessary for him to reside part of each year at Barton, but he was seldom long absent from St. James's Street and the Athenæum. He never married, and when he died at Brighton last February, in his eighty-fifth year, he was succeeded by his nephew, the present Sir Henry Bunbury.

Captain Parker Snow.

By the PRESIDENT.

William Parker Snow was, in some respects, and especially in his unswerving devotion to one idea, a remarkable man. He was the son of a lieutenant in the navy who served at Trafalgar, and his mother, a Miss Barker, was descended from the Protector through his youngest daughter, Frances, Lady Russell. Parker Snow was educated at the old Greenwich School under Dr. Riddle, and went out to Australia. After an adventurous life, he became intensely interested in the fate of Sir John Franklin's expedition. In 1850 Government vessels had been sent out to search, both by Barrow's Strait and Bering's Strait; but Lady Franklin considered that the scheme of search would not be complete without an examination of the coasts of Prince Regent's Inlet. She therefore fitted out a small vessel, named the *Prince Albert*, at her own expense, under the command of Commander Forsyth, R.N. Parker Snow eagerly volunteered his services, and they were accepted in the capacity of purser. The present writer was then a midshipman on board the *Assistance*. She was forcing a passage through the ice floes of Melville Bay, and on August 10, 1850, the *Prince Albert* was close to and remained in company until we reached the north water of Baffin's Bay four days afterwards. Those were days when the ice-saws were in use under the bows, sawing out triangular pieces of ice, and floating them out of the passage. The saws were worked by a sort of bell ropes, one to each man; and then it was that I first saw Parker Snow working away at our ice-saws with tremendous energy, full of zeal and enthusiasm, cheery and obliging. He appeared to be a man of about thirty years of age, strong, and capable of much hard work.

Commander Forsyth returned home without wintering, after having visited Franklin's first winter quarters at Beechey Island, and sailed a short distance down Prince Regent's Inlet. It was understood that Mr. Parker Snow strongly protested against the return, and even asked to be put on shore with another volunteer or two, and provisions. On his return he published a small illustrated volume, entitled 'The Voyage of the *Prince Albert* in Search of Sir John Franklin: a Narrative of everyday life in the Arctic Seas' (1851).

Parker Snow's next work was connected with the Fuegian mission; and in 1857 he published 'Two Years' Cruise off Tierra del Fuego and Patagonia, and in the River Plate' (2 vols.). But his thoughts always returned to Sir John Franklin and his gallant companions, and he volunteered his services, and submitted numerous reports and proposals to the Government. For years he maintained that there might be survivors, and in 1860 he published a pamphlet urging his reasons and arguments for this view. When no notice was taken of his representations, he became embittered; he believed that he had made numerous enemies in high places, and eventually he became almost a monomaniac on the subject. He lost all his property, and he and his wife were reduced to extreme poverty.

Captain Parker Snow had but one idea during the last twenty or thirty years of his life—the fate of the Franklin expedition. Through all his miseries and hardships he worked resolutely and untiringly. He compiled many volumes of indices of Arctic voyages from all sources, of notes and of biographical records of Arctic voyagers, which he called 'The Roll of Honour.' In want and misery, his poor wife dying before his eyes, his goods sold by creditors, still he worked on at his one idea, and he was working at his index volumes almost to the hour of his death.

The enthusiast had many good qualities, and was very grateful for any kindness. Our Council granted him £10 in aid but a few days before his death, and he found a few true friends, one or two amongst the most youthful of our Arctic aspirants. At last the over-wrought and worn-out brain found rest. Captain Parker Snow died rather suddenly on the 12th of last March, in his seventy-seventh year. Through the kindness of his friend Sir Duncan Campbell, his remains were decently interred, and his beloved Arctic medal, emblem of all his thoughts and all his work during so many sad and weary years, was placed upon his coffin. It is a melancholy story, and, with the memory of that bright day's work in Melville Bay before me, I for one am glad to say all that can be said of good for a brother Arctic.

CORRESPONDENCE.

A Pre-Columban Discovery of America.

THE President has done me the honour to submit my paper on a "Pre-Columban Discovery of America" to a criticism which, though appreciative, is adverse.

The criticism falls into two divisions—(1) an expression of doubts as to the authenticity and interpretation of the legend on Bianco's map, to which I shall return; and (2) a statement of further difficulties, which present themselves when these doubts are waived. The latter are twofold. First, the improbability of a Portuguese vessel crossing the Atlantic in 1447. Secondly, the difficulties of distance and direction arising from the legend "is distant 1500 miles to the west" on the ixola otinticha. As to the former, the improbability is possible, but the impossibility can scarcely be maintained. In point of mere distance, it is not very much further from Cape Verde to Brazil than from Portugal to the outer Azores, while the former voyage is made much the easier by wind and currents; and even granting that a ship "blown off the shore would have used every effort to return," are accidents to steering-gear or other tackle, which defeat the best intentions, unknown in the history of navigation? As to the second difficulty, it seems to arise from taking the legend to refer to the *course* of some particular vessel. If this *course* is reckoned from the Cape Verde Isles, which Mr. Markham has assumed is done by me, certain difficulties present themselves, which he sets forth clearly. But I have never thought of taking the legend as indicating the course of a vessel, and certainly have never suggested the undiscovered Cape Verde Isles as a starting-point. The simplest and most natural explanation of the unusual legend seemed to be that given on p. 226, namely, that it is a cartographic correction rendered necessary by the limits of the parchment on which the map is drawn. It is, as it were, a word of warning from the draughtsman to the future users of the map—"there is really some land south-west from Cape Verde, but lest you should imagine that it is as close as lack of space compels me to draw it, I must add that it is distant 1500 miles to the west." As to the "point of departure from which to reckon the miles, the most obvious is the position in which the island is shown on the map, while it is probably safest to take the round figures 1500 as meaning "a considerable number."

By making Bianco's inscription refer to the course of a vessel, and taking it in close connection with Galvão's somewhat fanciful narrative, the ingenious theory is arrived at, that the ixola otinticha may have been a third island of the Azores, of which group two had been rediscovered in 1432 and 1444. But a glance at the sketch of the map—Fig. 1—should suffice to show how improbable this is. Here are to be seen no less than seven of the new Azores in their proper places, and far away to the south the ixola otinticha as big in itself as the whole group. In my paper, reasons, based on the difference in latitude, are given to show that the island could not have been meant for any of the Cape Verde Isles, and *a fortiori* it can scarcely be intended for one of the Azores. In fact, to find one of the Azores placed south of Cape Verde, would be as startling as to have Ireland set down in the latitude of the Canaries.

These difficulties, to which I have tried to reply, are based on an acceptation of my reading of the legend on Bianco's map, but in the earlier part of the criticism doubts are expressed about certain points which must not be passed over. They include the threefold suggestion of (1) a possible misreading, (2) interpolation by a later hand, and (3) mutilation of the map.

As to the first, I can only say that the reading adopted seemed the only possible one after a long and careful examination; that it has been confirmed for me by expert palæographers; that it differs in but a single letter from the independent readings of Canale, Desimoni, and Fischer, the only authorities who have written on the subject; and, finally, that the well-known scholar, Padre Ceriani, Curator of the Ambrosian Library, where the map is preserved, assures me that there are only two letters about which there can be uncertainty, namely, the first, which looks like an *a*, and the *e* in "xe," which is doubtful, but probable.

With regard to the second, such a suggestion is unfortunately more easily made than replied to, but, on the other hand, should surely require the clearest evidence to support it. It is really a question for palæographical experts, and more than one have assured me that the handwriting is identical with that in the rest of the map. To convince myself, I compared it letter by letter with the rest, and found apparently absolute identity; even the same habit of joining preposition to noun is to be seen (cf. "aponente" in Fig. 4, with "alondra" in Fig. 3, p. 226).

Finally, as to the possible mutilation of the manuscript by excision of a line, it only remains for me to express deep regret that such a suggestion, which would open up endless avenues for the wildest speculations to sport in, should receive the strong sanction of the President's name. I trust it was only thrown out as a possible objection, which should at once be met, even though this is not easy. At first there seemed but two ways of answering it—to indicate the absence of motive for such mutilation, and to point out that the parchment is trimmed at the neck end more on the right than on the left, whereas if the trimming had been subsequent to the date of the drawing, it would have probably been made symmetrical, in which case the whole island would have gone; but happily there seems to be a stronger argument. Notice the *a* in "mia;" it has a remarkable flourish. This is not to be found in the other *a*'s, in "ixola" or "otinticha." Now, an examination of the rest of the map shows that this flourish is always used when an *a* ends a legend, and only when this is the case (cf. the terminal *a*'s in "terra de palmera," and "terra derrea" in Fig. 2, p. 224). It would therefore appear not unreasonable to believe that "mia" is the last word of the legend, and that nothing is missing.

I have ventured to reply at some length, since the President kindly says that he is still open to conviction. I can but trust that some difficulties have been removed.

The above was written before I had seen Professor Westlake's letter. A delay in publication enables me to express my cordial thanks for its support. The opinion of so eminent a jurist in a matter which must be largely a question of the balance of evidence is of the greatest value.

H. Yule Oldham.

King's College, Cambridge.

MEETINGS OF THE ROYAL GEOGRAPHICAL SOCIETY, SESSION 1894–1895.

Ninth Ordinary Meeting, March 25, 1895.—Clements R. Markham, Esq., c.b., f.r.s., President, in the Chair.

Elections.—*Lesley William Alexander; Arthur Austin; G. F. Scott Elliot; Baron Anatole von Hügel; Sir Charles Allen Lawson; James Murray Molesworth; Sir Henry Rawlinson, Bart.; Lieut.-Colonel R. Gardner Warton.*

The President: There is one name in the list of the new Fellows of the Society which I cannot help alluding to with pleasure; it is the name of Sir Henry Rawlinson. We are all delighted to find that this name still remains on the list as one of our associates.

Subscriptions have been coming in for the International Congress, and I am glad to say that several important city companies, the Goldsmiths, Fishmongers, Drapers, and others, have subscribed very handsomely. I have to announce that on May 20 we shall commemorate the fiftieth anniversary of the sailing of Sir John Franklin's expedition from England, and I may mention that it is the intention of H.R.H. the Duke of York to be present on that occasion. The Society's conversazione will take place on the evening of the anniversary, May 27.

The Paper read was:—

"Chitral, Hunza, and the Hindu Kush." By Captain F. E. Younghusband, c.i.e. (Indian Staff Corps).

Tenth Ordinary Meeting, April 8, 1895.—Clements R. Markham, Esq., c.b., f.r.s., President, in the Chair.

Elections.—*Geo. T. Bean; Jno. Geo. Dunn; Howard Haywood; James Ford Hughes; William Langlands; Captain F. Lee (4th Hussars); Charles Algernon Moreing; Henry Cecil Low Morris, M.D., etc.; Joseph Waldie Peirson; M. M. Rodocanachi; H. Thornhill Timmins.*

The President said: I have to announce that we have postponed the anniversary dinner until the week of the meeting of the Congress, in order to give us an opportunity of inviting our foreign friends as guests. The subscriptions for the Congress are coming in tolerably satisfactorily, and we are going to send out a circular inviting the Fellows to show hospitality to our guests; but Fellows of the Royal Geographical Society are so well known for their extraordinary hospitality on all occasions of this kind, that I thought it was almost unnecessary to send a reminder.

The Paper read was:—

"A Journey to Mount Ruwenzori, and South to Lake Tanganyika." By G. F. Scott-Elliot.

GEOGRAPHICAL LITERATURE OF THE MONTH.

Additions to the Library.

By HUGH ROBERT MILL, D.Sc., *Librarian*, R.G.S.

The following abbreviations of nouns and the adjectives derived from them are employed to indicate the source of articles from other publications. Geographical names are in each case written in full:—

A. = Academy, Academie, Akademie.
Ann. = Annals, Annales, Annalen.
B. = Bulletin, Bollettino, Boletim.
Com. = Commerce, Commercial.
C. R. = Comptes Rendus.
Erdk. = Erdkunde.
G. = Geography, Geographie, Geografia.
Ges. = Gesellschaft.
I. = Institute, Institution.
J. = Journal.
M. = Mitteilungen.
Mag. = Magazine.
P. = Proceedings.
R. = Royal.
Rev. = Review, Revue, Revista.
S. = Society, Société, Selskab.
Sitzb. = Sitzungsbericht.
T. = Transactions.
V. = Verein.
Verh. = Verhandlungen.
W. = Wissenschaft, and compounds.
Z. = Zeitschrift.

On account of the ambiguity of the words *octavo*, *quarto*, etc., the size of books in the list below is denoted by the length and breadth of the cover in inches to the nearest half-inch. The size of the *Journal* is 10 × 6½.

EUROPE.

Alps—Gross-Venediger. **Löwl.**
Der Gross-Venediger. Von Prof. Ferdinand Löwl. (Separat-Abdruck aus dem Jahrbuch der k. k. geolog. Reichsanstalt, 1894, Bd. 44, Heft 3.) Wien, 1894. Size 10½ × 7½, pp. [18]. *Presented by the Author.*

Austria-Hungary—Sonnblick. **Obermayer and Schindler.**
Sitzb. A.W. Wien (Abth. II. a.) **103** (1894): 107–114.
Die trigonometrische Höhenbestimmung des Hohen Sonnblicks in der Goldberggruppe der Hohen Tauern. Von Oberst A. v. Obermayer und Hauptmann Anton Schindler.

England. **Rooper.**
Cassell's New Geographical Readers. Third Book. England. [By T. G. Rooper.] London: Cassell & Co., 1894. Size 7 × 5½, pp. 190. *Illustrations. Price* 1*s*. *Presented by the Author.*

England and Wales—Gazetteer. **Brabner.**
The Comprehensive Gazetteer of England and Wales. Edited by J. H. F. Brabner. [Vol. iv. Let—Nev.] London: W. Mackenzie [1895]. Size 10½ × 7½, pp. 336. *Maps and Plans. Presented by the Editor.*

A large portion of this volume is occupied by the article London, while two other large towns, Liverpool and Manchester, claim considerable space.

France—La Charente. *B.S.G. Rochefort* **16** (1894): 253–271. **Fermond.**
La Charente préhistorique. Vallées de la Tardoire et du Bandiat. Notes sur les différents ages de la pierre et sur l'age du bronze dans ces deux vallées. Par M. J. Fermond. *With Map and Plate.*

France—Languedoc. **Malavialle.**
Le Littoral du Bas-Languedoc. Par le Professeur L. Malavialle. Montpellier, 1894. Size 10 × 6½, pp. 70. *Presented by the Author.*

Holland. *Tijds. Ned. Aard. Genoots. Amsterdam* (2) **11** (1894): 871–910. **Lorié.**
De gedaantewisselingen der Schelde en der Maas. Door Dr. J. Lorié. *With Maps.*

Hungary—Lake Balaton. *Abrégé B.S. Hongroise G.* **23** (1894): 20–23. **Lóczy.**
Bericht über die Tätigkeit der Balatonsee-Kommission in den Jahren 1892 und 1893. [By Ludwig v. Lóczy.]

Hungary—Transylvania. *Abrégé B.S. Hongroise G.* **23** (1894): 10–13. **Téglás.**
Nouvelles recherches topographiques sur la Dacie. Importance du camp romain " Vurvu lui Petrin." [By Gabriel Téglás.]

Hungary—Wells. *Abrégé B.S. Hongroise G.* 23 (1894): 1–10. **Hanusz.**
Les puits miraculeux de notre patrie. Par Etienne Hanusz.

Iceland. *G. Tidskrift* 13 (1895–96): 3–37. **Thoroddsen.**
Fra det sydøstlige Island. Rejseberetning fra Sommeren, 1894, af Dr. phil. Th. Thoroddsen. *With Map.*

Italy—Rome. **Murray.**
A Handbook of Rome and its Environs. Fifteenth Edition. With Ninety Plans and Maps of the City and environs. Classical Antiquities. Edited by Prof. Rodolfo Lanciani. Sculpture Galleries. Edited by A. S. Murray. Picture Galleries. Edited by the late Rt. Hon. Sir A. Henry Layard. Mediæval Antiquities. Edited by the Rev. H. W. Pullen. General Editor, the Rev. H. W. Pullen. London: John Murray, 1894. Size 7 × 5, pp. xii., 92, and 492. *Price* 10*s*. *Presented by the Publisher.*

This edition deserves special notice on account of the remarkably small size of the volume obtained by the use of a special paper, light, thin, but remarkably opaque, making the book one well adapted for the pocket. Several new maps are also introduced with great advantage.

Norwegian Pilot. **Fabricius.**
Den Norske Lods, udgiven af den Geografiske Opmaaling. 7^de^ Hefte. Fra Aalesund til Bejan og Trondhjem, samt til Kvalø paa Smølens Vestside. Ved J. S. Fabricius. Kristiania: Grøndahl & Søn, 1893. Size 9 × 6, pp. xxiii. and 286. *Price* 1 *kr*. *Presented by the Author.*

Portugal. *J. Manchester G.S.* 9, 1893 (1895): 227–257. **Mellor.**
Notes of a Journey in Portugal in 1893. By E. W. Mellor. *With Maps and Illustrations.*

Pyrenees—Andorra. *Scottish G. Mag.* 11 (1895): 105–114. **Smith.**
Andorra: the Republic of the Pyrenees. By John Smith.

Russia—Caucasus. **Levier.**
Émile Levier. A travers le Caucase. Notes et impressions d'un Botaniste. Avec de nombreuses illustrations de F. Huguenin-Lassauguette et des reproductions directes d'après les photographies de MM. Stéphen Sommier et Vittorio Sella. Paris: Librairie Fischbacher [1895]. Size 10 × 7, pp. 348. *Map.* *Price* 10 *francs.*

There is geography and much general observation as well as botany in this record.

Russia—Finland. ———
Finland in the Nineteenth Century by Finnish Authors. Illustrated by Finnish Artists. Helsingfors: printed by F. Tilgmann, 1894. Size 14 × 11, pp. 368. *Map and Illustrations.*

This is a remarkable volume, written in Swedish by some of the most eminent scientific and literary men in Finland, translated into English by Finnish ladies, illustrated by Finnish artists, and printed in Helsingfors. It bears emphatic testimony to the vigour and artistic productiveness of the Finnish people, and forms a monograph on Finland such as few countries are fortunate enough to possess. The literary contents include The Country, and The People, by Z. Topelius; Political Review, by L. Mechelin; National Economy and Public Education, by various authors; Scientific and Literary Associations, including an account of the Society for the Geography of Finland, and the Finnish Geographical Society; three chapters on the literature of Finland, and one on Art, all profusely illustrated by admirable reproductions. Three fine maps are also given. The literary perfection of the English translation is guaranteed by the editorial supervision of the late Mr. James Sime.

Scotland. **Murray.**
Handbook for Travellers in Scotland. Sixth Edition. With travelling Maps and Plans. London: John Murray, 1894. Size 7 × 5, pp. xxxvi. and 476. *Price* 9*s*. *Presented by the Publisher.*

This edition is recast and almost entirely re-written. It is printed on thin paper, making the volume very portable, and is enriched by a new set of maps, most of which are coloured orographically.

Southern Europe—Sicily and Portugal. **Boutroue.**
Une heure en Sicile. Un coup d'œil sur le Portugal. Deux conférences faites à la Société de Géographie de Paris, accompagnées de deux cartes.

Par Alexandre Boutroue. Extrait de la Revue de Géographie (Septembre Octobre-Décembre 1894, Janvier 1895). Paris: E. Leroux, 1895. Size 10 × 6½, pp. 60. *Presented by the Author.*

Switzerland—Lake of Geneva. **Forel.**

F.-A. Forel. Le Léman. Monographie Limnologique. Tome Second. Lausanne: F. Rouge, 1895. Size 10 × 6½, pp. 652. *Map and Diagrams. Price* 15*s.*

A full review of the two volumes of this most important limnological work will appear.

ASIA.

Caucasia. *Verh. Ges. Erdk. Berlin* **22** (1895): 192–216. **Radde.**

Ein Neujahrsfahrt in das Talyscher Tiefland. Von Dr. Gustav Radde.

An account of a hunting trip made in January of the present year.

Central Asia—Karategin, etc. **De Rocca.**

Rev. G. **36** (1895): 24–37, 105–115, 179–188.

Karatéghine et Darvoz. Par Félix de Rocca.

Central Asia—Mongolia and Tibet. **Rockhill.**

Diary of a Journey through Mongolia and Tibet in 1891 and 1892. By William Woodville Rockhill. Washington: Smithsonian Institution, 1894. Size 9½ × 6, pp. xx. and 414. *Map and Illustrations. Presented by the Author.*

The journey here described has been already recognized by the presentation of the Royal Geographical Society's gold medal to Mr. Rockhill. The present volume is a book of adventurous travel; but it is much more, bearing evidence, not only of Mr. Rockhill's observing power, but of his profound oriental scholarship. The appendices include vocabularies, geographical and meteorological tables.

China. **Gundry.**

China, Present and Past. Foreign Intercourse, Progress and Resources, the Missionary Question, etc. By R. S. Gundry. London: Chapman & Hall, 1895. Size 9 × 6, pp. xxxii. and 414. *Maps. Price* 10*s.* 6*d. Presented by the Publishers.*

Mr. Gundry has thrown into book form a number of valuable articles on different phases of Chinese life which had previously appeared in periodicals, supplementing these and adding a map. The chapter on the Yellow river is of considerable geographical interest; but the book, taken as a whole, is most serviceable in throwing light on Chinese laws and life.

China. **Schlegel.**

Problèmes Géographiques. Les peuples étrangers chez les historiens Chinois. XVIII. San Sien Chan. Les trois Iles enchantées. Par Gustave Schlegel. Leyden: E. J. Brill, 1895. Size 10 × 7, pp. 66. *Presented by the Author.*

India. ———

A Classified List, in alphabetical order, of Reports and other publications in the Record Branch of the India Office, December, 1892. London: Printed by Eyre and Spottiswoode, 1894. Size 13½ × 8½, pp. viii. and 230. *Presented by the Secretary of State for India.*

A subject catalogue of the voluminous contents of the India Office Library, the value of which for reference would have been enhanced had some indication been given of the system of classification employed.

India. *J.S. Arts* **43** (1895): 310–325. **Menon.**

Village Communities in Southern India. By C. Krishna Menon.

India—Burma, Mandalay. **Colbeck.**

Letters from Mandalay. A series of letters for the most part written from the Royal City of Mandalay during the Troublous Years of 1878–79; together with letters written during the last Burmese Campaign of 1885-88, by the late James Alfred Colbeck. Edited by George H. Colbeck. Knaresborough: A. W. Lowe, 1892. Size 7½ by 5, pp. vi. and 114. *Presented by the Editor.*

India—Burma, Spirit-levelled Heights. **Hill.**

Trigonometrical Branch, Survey of India, Spirit-levelled Heights. No. 1, Burma. Season 1892–93. Prepared . . . by Lieut.-Col. J. Hill, under the directions of Colonel G. Strahan. . . . Dehra Dun: B. V. Hughes, 1894. Size 10 × 6, pp. vii. and 84. *Map. Presented by the Secretary of State for India.*

India—Ceylon and Burma. **Murray.**

A Handbook for Travellers in India, Ceylon, and Burma, including the Provinces of Bengal, Bombay, and Madras (the Punjab, North-West Provinces, Rajputana, Central Provinces, Mysore, etc.), the Native States, Assam, and Cashmere. Second Edition. *With Seventy-five Maps and Plans.* London: John Murray, 1894. Size 7 × 5, pp. lxiv. and 484. *Price 20s. Presented by the Publisher.*

Thorough revision and the inclusion of additional maps make this admirable guide still more useful in its new edition.

Indian Empire—Sikkim. **Louis.**

The Gates of Thibet. Additional Chapter. Size 9½ × 6½, pp. [24]. *Plates. Presented by the Author.*

This additional chapter deals with the frontier market of Yatong, and is illustrated by several photographs.

India—Kashmir Frontier. *J.R. Colonial I.* **26** (1895): 385–397. **Younghusband.**

On the Kashmir Frontier. By Captain F. E. Younghusband.

India—Punjab. **Latif.**

History of the Panjáb, from the remotest antiquity to the present time. By Syad Muhammad Latif. Calcutta: the Calcutta Central Press Co., 1891. Size 10 × 7½, pp. xx. and 652. *Map. Presented by the Author.*

This is a work of much learning and research, treating the history of the Punjab in five periods—the Early period down to the Mohammedan invasion, the Mohammedan period, the Rise of the Sikhs, the Life of Maharaja Runjit Singh, and the Period following the death of Runjit Singh.

India—Punjab. ———

Report on the Administration of the Punjab and its Dependencies for 1893–94. Lahore: Punjab Government Press, 1894. Size 13½ × 8½, pp. xiv., 10, 222, and clxvi. *Map and Diagram. Presented by the Secretary of State for India.*

Japan. **Chamberlain and Mason.**

A Handbook for Travellers in Japan. By Basil Hall Chamberlain and W. B. Mason. With twenty-six Maps and Plans and numerous Illustrations. Fourth Edition. London: John Murray, 1894. Size 7 × 5, pp. x., viii., and 530. *Price 15s. Presented by B. H. Chamberlain, Esq.*

The guide-book has been brought to date.

Japan. *T. Asiatic S. Japan* **22** (1894): 253–284. **Droppers.**

The Population of Japan in the Tokugawa Period. By Garrett Droppers.

Japan. **Wenckstern**

A Bibliography of the Japanese Empire. Being a Classified List of all Books, Essays, and Maps in European languages relating to Dai Nihon [Great Japan], published in Europe, America, and in the East from 1859–93 A.D. [VIth year of Ansei—XXVIth of Meiji], compiled by Fr. von Wenckstern. To which is added a facsimile reprint of Léon Pagès, Bibliographie Japonaise depuis le XV^{e} siècle jusqu'à 1859. Leiden: E. J. Brill; London: Kegan Paul & Co., 1895. Size 10 × 6, pp. xiv., 338, and 68. *Price 25s.*

Japan—Railways. *T. Asiatic S. Japan* **22** (1894): 115–252. **Trevithick.**

The History and Development of the Railway System in Japan. By Francis H. Trevithick. *With Map and Plate.*

An exhaustive review of the history and present development of the Japanese railway system.

Korea. **Gowland.**

Notes on the Dolmens and other Antiquities of Korea. By W. Gowland. [Reprinted from the *Journal of the Anthropological Institute*, February, 1895.] London: Harrison & Sons, 1895. Size 8½ × 5½, pp. 16. *Plate. Presented by the Author.*

Korea. **Savage-Landor.**

Corea or Cho-sen, the Land of the Morning Calm. By A. Henry Savage-Landor. London: W. Heinemann, 1895. Size 9 × 6, pp. xiv. and 304. *Portrait and Illustrations.*

Mr. Landor's successful record of his travels in Yezo will ensure a good reception for his account of Korea, in which the same aptness of illustration and vividness in description are to be found. The book deals rather with sketches of life and character, than with travels through the country.

Korea. *J. Anthropological I.* **24** (1895): 299–330. **Saunderson and Gowland.**

Notes on Corea and its People. By H. S. Saunderson. Notes on the Dolmens and other Antiquities of Korea. By W. Gowland.

Persia—Khorasan. *Globus* **67** (1895): 149–152. **Hahn.**

Das heutige Chorasan. Mitgeteilt von C. Hahn. Tiflis.

Philippine Islands—Mindanao. **Aguilar.**

Mindanao, su Historia y Geografia. Por José Nieto Aguilar. Con un prologo de Don Francisco Martin Arrúe. Madrid, 1894. Size 9½ × 6½, pp. viii. and 152. *Map.*

Russia—Mongolia. *M. G. Ges. Wien* **38** (1895): 26–57. **Leder.**

Eine Sommerreise in der nördlichen Mongolei im Jahre 1892. Von Hans Leder. I. Von der Tola an den Orchon.

Russian Armenia. *J.S. Arts* **43** (1895): 225–233. **Markoff.**

Russian Armenia and the prospects for British trade therein. By Dr. Anatolius Vladimirovich Markoff.

An interesting account of the people and commercial resources of Russian Armenia.

Sakhalin. *Tijds. Ned. Aard. Genoots. Amsterdam* (2) 11 (1894): 737–748. **Kramp.**

Die geschiedenis der ontdekking van het eiland Sachalin. Door F. G. Kramp.

Siam—Upper Mekong. **Smyth.**

Notes of a Journey on the Upper Mekong, Siam. By H. Warington Smyth. *With Maps and Illustrations.* Published for the Royal Geographical Society, by John Murray, 1895. Size 9 × 6, pp. x. and 110. *Price to the Public*, 7*s.* 6*d.*

Mr. Warington Smyth's paper, recently read before the Royal Geographical Society, has been published in this attractive form with the author's numerous sketches, instead of being printed in the *Geographical Journal*. It is sold to Fellows at a reduced price.

Syria. *Z. Ges. Erdk. Berlin* **29** (1894): 142–188, 475–550. **Hartmann.**

Das Liwa Haleb (Aleppo) und ein Teil des Liwa Dschebel Bereket. Reisen, ausgeführt mit Unterstützung der Karl Ritter-Stiftung der Gesellschaft für Erdkunde, und dargestellt von Martin Hartmann. *With Map.*

Tibet—Religion. **Waddell.**

The Buddhism of Tibet or Lamaism, with its Mystic Cults, Symbolism, and Mythology, and in its relation to Indian Buddhism. By L. Austine Waddell, M.B. London: W. H. Allen & Co., 1895. Size 9 × 6, pp. xviii. and 598. *Illustrations. Presented by the Secretary of State for India.*

Surgeon-Major Waddell enjoyed many exceptional privileges in investigating modern Buddhism, and the result is a work of quite unique interest. It is the most authoritative exposition of the ritual and belief of modern Lamaism which has yet been published, and on this account it forms a notable contribution to the history of Buddhism.

Turkey in Asia. **Cuinet.**

La Turqiue d'Asie. Géographie administrative, statistique, descriptive et raisonnée de chaque province de l'Asie-Mineure. Par Vital Cuinet. Tome Quatrième. Fascicule 11. Paris: E. Leroux, 1894. Size 11 × 7½.

This instalment deals with the Mutessariflik of Ismidt.

AFRICA.

Africa. **Brown.**

The Story of Africa and its Explorers. By Robert Brown. Vol. iv. Europe in Africa—Colonies and Colonists—the Scramble for an Empire—a Continent under Companies. London: Cassell & Co., 1895. Size 10½ × 8, pp. viii. and 312. *Illustrations. Presented by the Publishers.*

This volume concludes the work, which forms on its completion the most handsomely illustrated description of Africa with which we are acquainted. The letterpress is written in a thoroughly popular style, and the opinions expressed are characterized by candour and impartiality.

NEW MAPS.

By J. Coles, *Map Curator*, R.G.S.

EUROPE.

England and Wales. **Ordnance Survey.**

Publications issued since March 8, 1895.

1-inch—General Maps:—

England and Wales:—154, engraved in outline, 1*s*.

——————:—(Revision), 274, 306, 315, 321, engraved in outline with contours, 1*s*. each.

The issue of the above sheets commences the publication of the revised map of England and Wales on the 1-inch scale.

6-inch—County Maps:—

England and Wales:—**Lancashire**, 54 s.w., 60 n.e., 61 s.w., 62 n.w., 64 s.w., 69 n.e., 73 n.w., 77 n.e., s.e., 81 n.w., 85 s.w., 89 s.e., 89 n.e., 89a n.w., 97 n.w., 97a s.w., 101 s.w., 105 n.e. **Yorkshire**, 229 s.w., 232 s.e., 270 n.e., s.e., 1*s*. each.

25-inch—Parish Maps:—

England and Wales:—**Devonshire** (Revision), CXVII. 3, 4, 8, 11, 12, 15, 16; CXXIII. 4; CXXIV. 1, 2, 3, 4, 6, 7, 8, 10, 11, 12, 13, 14, 15, 16; CXXIX. 1, 2, 3, 4, 8; CXXX. 1, 2, 5, 6, 7, 8, 9, 10, 11, 12, 14, 15 and 16, 3*s*. each. **Cornwall** (Revision), XXXVII. 12, 16; XXXVIII. 13; XLV. 4, 8, 12, 16; XLVI. 9, 13; LIV. 3, 4, 8, 12; LV. 1, 5, 6, 10, 13, 14, 3*s*. each. **Lancashire**, CXI. 12 and 16, 11*s*. 6*d*. each; CXII. 9, 14*s*. (coloured). **Yorkshire**, VI. 10, 14*s*.; 12, 8*s*. (coloured).

Town Plans—5-feet scale:—

London—Re-survey, VI. 66, 76, 77; VII. 73, 2*s*. 6*d*. each.
Stockport (Revised), VIII., 2*s*. 6*d*.; Index, 2*d*.

(*E. Stanford, Agent.*)

ASIA.

India. **Geological Survey of India.**

Geological Map of India. Scale 1 : 2,027,520 or 32 stat. miles to an inch. Corrected to December 31, 1892. Prepared under the supervision of R. D. Oldham, A.R.S.M., superintendent, and published at the Geological Survey Office. W. King, D.SC., Director, Geological Survey of India. Second Edition. *Presented by H.M. Secretary of State for India, through the India Office.*

AFRICA AND MADAGASCAR.

Algeria. **Service Géographique de l'Armée, Paris.**

Carte topographique de l'Algérie. Scale 1 : 50,000 or 1·26 inch to a stat. mile. Service Géographique de l'Armée, Paris. Sheet No. 75, Oued Zenati; No. 77, Souk-Arrhas. *Price* 1 *fr.* 50 *cents each sheet.*

Central Africa. **Götzen.**

Vorläufige Skizze des Reiseweges des Lt. Graf von Götzen quer durch Central-Afrika, 1894. Scale 1 : 5,000,000 or 79 stat. miles to an inch. Gesellschaft für Erdkunde zer Berlin. Sitzung vom 2 Febr. 1895.

Madagascar. **Grandidier and Roblet**

Carte topographique de l'Imerina (Province Centrale de Madagascar). Par A. Grandidier, Membre de l'Institut, et les R. P. Roblet et Colin, S.J., missionnaires à Madagascar. Scale 1 : 200 000 or 3·1 stat. miles to an inch. Feuille Nord. Mars 1895. Gravée et imp. par Erhard, F^{res}, Paris.

Carte de la Partie Septentrionale d'Imerina. Par A. Grandidier, Membre de l'Institut, et les R. P. Roblet et Colin, S.J. Scale 1 : 100,000 or 1·6 stat. mile to an inch. Imp. Erhard Frères, Paris. 3 Sheets. A. Grandidier, 'Histoire de Madagascar,' t. ii. Géographie physique.

Mashonaland, etc. **Selous.**

Beira Railway. Map showing the route of the line. Scale 1 : 1,000,000 or 15·6 stat. miles to an inch. Messrs. G. Philip & Son, London, 1895. *Presented by Messrs. G. Philip & Son.*

This is the map published in the *Geographical Journal*, January, 1895, on which the Beira railway has been laid down.

Nicaragua. **Mierisch.**

Geologische Karte des nördlichen Teiles der Republik Nicaragua. Im Auftrage der Regierung in den Jahren 1892 und 1893 aufgenommen u. gezeichnet von Dr. Bruno Mierisch. Scale 1 : 700,000 or 10·9 stat. miles to an inch. Petermann's *Geographische Mitteilungen.* Jahrgang, 1895, Tafel 4. Gotha: Justus Perthes. *Presented by the Publisher.*

GENERAL.

Historical Geography. **Schrader.**

Atlas de Géographie Historique. Ouvrage contenant 54 grandes Cartes doubles en couleurs, accompagnées d'un Texte Historique au dos et d'un grand mombre des cartes de Détail, Figures, Diagrammes, etc. Par une Réunion de Professeurs et de Savants, sous la direction Geographique de F. Schrader, director des travaux cartographiques de la librairie Hachette et Cie. Paris: Hachette et Cie, 1895. Livraison 12^{e}. *Price* 1 *fr.* 50 *c.* *Presented by the Publishers.*

Sheet 15 contains maps illustrating the dismemberment of the Roman Empire in the fifth century; Gaul, Spain, and Italy in the year 506; and South-Western Europe as divided among the Ostrogoths, Vandals, and Visigoths in the year 526. Sheet 36 is a map to illustrate the conflict between Prussia and Austria. Sheet 54 is a map showing the possessions of the different countries in all parts of the world. There are two subsidiary maps, one showing density of population and the expansion of the principal races, the other shows the domain and expansion of the principal languages. Each map is accompanied by well-written letterpress.

CHARTS.

Admiralty Charts. **Hydrographic Department, Admiralty.**

Charts and Plans published by the Hydrographic Department, Admiralty, November and December, 1895. *Presented by the Hydrographic Department, Admiralty.*

No.	Inches.	
1720 m =	6·0	England, east coast:—Filey bay. 1*s.* 6*d.*
1972 m =	1·0	Norway, west coast:—Approaches to Trondhjem, eastern sheet. 3*s.*
2073 m =	0·97	France, north coast:—Cape Barfleur to Courseulles. 2*s.* 6*d.*
2146 m =	0·97	France, north coast:—Havre to River Durdent. 2*s.* 6*d.*
2147 m =	0·97	France, north coast:—River Durdent to Cayeux. 2*s.* 6*d.*
2102 m =	1·48	Canada, Lake Huron:—Western islands to Waubaushene. 3*s.* 6*d.*
1480 m =	0·12	West Indies:—Tobago to Tortuga. 2*s.* 6*d.*
1966 m =	0·09	South America, north coast:—Tortuga to Cape La Vela. 2*s.* 6*d.*
2259 m =	2·75	West Indies, Colombia:—Savanilla harbour (plans, Rio Magdelena, Puerto Colombia pier). 1*s.* 6*d.*
1281 m =	various.	Plans on the Coast of Chile:—Port Calbuco and Huito inlet; Reloncavi inlet; Sotomó bay; Condor, Ranu, Muicolpue, Milagro and Lamehuapi coves; Yenez bay. 1*s.* 6*d.*

1340 m = various. Plans on the coast of Peru:—Ylo road, Islay bay, Atico road, Lomas road, Ports San Nicholas and San Juan, Independencia bay. 1*s*. 6*d*.

1347 m = various. Plans on the coast of Peru:—Pisco bay, Port Chilca, Chancay bay, Huacho bay, Barranca and Supé bays. 1*s*. 6*d*.

1812 m = various. Plans on the coast of Chile:—Llico road and Vichuquen lagoon, Curanipo road, entrance of the river Maule, Port Tongoi. 1*s*. 6*d*.

599 m = 1·4 Africa, west coast:—Sheet 6: Cape Verde to Cape Roxo, including the river Gambia (plan, Rufisque anchorage). 1*s*. 6*d*.

663 m = 1·92 Africa, east coast:—Mansa and Tanga bays. 2*s*. 6*d*.

2161 m = 2·36 Red Sea:—Ghubbet Soghra. 1*s*. 6*d*.

212 m = 5·14 Sumatra, west coast:—Koninginne bay and Padang road. 1*s*. 6*d*.

2183 m = various. Harbours and anchorages on the north coast of Nipon:—Shibayama harbour, Tsuiyama harbour, Tsuruga bay, Sakai harbour, Wajima anchorage. 1*s*. 6*d*.

2198 m = 6·0 Harbours and anchorages on the north coast of Nipon:—Kaka Ura and Kasa Ura. 1*s*. 6*d*.

2165 m = 3·0 New Hebrides:—Maskelyne islands (plan, Vao anchorage). 1*s*. 6*d*.

856 m = various. Anchorages in the New Hebrides:—Rannon anchorage, Sasun bay, Craig cove, Masevonu anchorage, Losolav anchorage, Dip point anchorage. 1*s*. 6*d*.

2132 m = 5·9 New Hebrides, anchorages in Epi island:—Yemyu cove, Nelson bay, Foreland anchorage, Diamond bay, Ringdove bay. 1*s*. 6*d*.

991 m = various. Anchorages on the coasts of Yezo:—Plan added, Kushiro road; new plan, Hamanaka bay. 1*s*. 6*d*.

1328 m = various. Anchorages in the Chonos archipelago:—Plans added: Anna Pink bay, Port Refuge, Patch cove. 1*s*. 6*d*.

(*J. D. Potter, Agent.*)

Charts Cancelled.

No.	Cancelled by	No.
1720 Filey bay	New Chart. Filey bay	1720
2295 Plan of Orland bay on this sheet	New Chart. Approaches to Trondhjem . . .	1972
394 Trinidad island to Los Roques	New Chart. Tobaga to Tortuga	1480
395 Los Roques to Cape La Vela	New Chart. Tortuga to Cape La Vela . . .	1966
2259 Savanilla harbour and Rio Magdalena.	New Chart. Savanilla harbour	2259
1298 Anna Pink bay, Port Refuge, Patch cove. 1328 Anchorages in the Chonos Archipelago.	New Chart. Anchorages in the Chonus Archipelago	1328
567 Port Culbuco and Huito inlet, Reloncavi inlet, Sotomó bay. 1281 Milagro, Lancehuapi, Muicolpue, Condor, and Ranu coves; Port Yañez.	New Chart. Plans on the coast of Chile . .	1281
1340 Isley bay, Atico road, Ylo road. 1369 Lomas road, Ports San Nicholas and San Juan. 1295 Independencia bay.	New Chart. Plans on the coast of Peru . . .	1340

1291 Pisco bay. 1710 Port Chilca. 1347 Barranca and Supé bays, Huacho bay, Chancay bay.	New Chart. Plans on the coast of Peru . . .	1347
809 Port Tongoy 1312 Llico road and Vichuquen lagoon, Curanipe road, entrance of Maule river.	New Chart. Plans on the coast of Chile . .	1312
599 Sheet 6: Cape Verde to Cape Roxo.	New Chart. Sheet 6: Cape Verde to Cape Roxo	599
663 Tanga bay and approaches.	New Chart. Mansa and Tanga bays	663
212 Padang road	New Chart. Koninginne bay and Padang road .	212
61 Plan of Tsuruga bay on this sheet.	New Chart. Anchorages on the north coast of Nipon	2133
856 Plans of Yemyu cove, Nelson bay, Foreland anchorage, and Diamond bay, on this sheet.	New Chart. Anchorages in Epi island . . .	2132
1508 Plan of Maskelyne islands on this sheet.	New Chart. Maskelyne islands	2165
856 Anchorages in New Hebrides islands. 1508 Plan of Dip point anchorage on this sheet.	New Chart. Anchorages in the New Hebrides .	856

335 A small river 10 miles westward of Buffalo.

Charts that have received Important Corrections.

No. 109, England, east coast:—Entrance to the river Humber. 2320, Nova Scotia:—Approach to Halifax. 1467, Gulf of Mexico:—Cape San Blas to Vermilion bay. 534, Guiana:—Approaches to Cayenne. 1337, Magellan strait:—First narrows to Sandy point. 455, Anchorages on the coasts of California and Oregon. 654, North America, north-west coast:—Bering strait. 674, Africa, east coast:—Dar es Salaam harbour and adjoining anchorages. 7, Aden and adjacent bays. 941B, Eastern archipelago, western portion. 2060A, China sea, southern portion. 61, Harbours and anchorages on the north-west coast of Nipon. 993, Anchorages in Yezo island. 1466. China:—Hongkong. 1629, Tasmania:—Macquarie harbour. 2726, New Zealand, west coast:—Manukau harbour. 2553, New Zealand:—Forveaux strait and Stewart island. 214, Pacific ocean:—Solomon islands. 1508, Anchorages in New Hebrides islands.

J. D. Potter, agent.

Pilot Chart. **U.S. Hydrographic Office.**

Pilot Charts of the North Atlantic Ocean and North Pacific Ocean for April, 1895. Published at the Hydrographic Office, Bureau of Navigation, Department of the Navy, Washington, D.C., Charles D. Sigsbee, Commander U.S. Navy, Hydrographer. *Presented by the U.S. Hydrographic Office.*

PHOTOGRAPHS.

N.B.—It would greatly add to the value of the collection of Photographs which has been established in the Map Room, if all the Fellows of the Society who have taken photographs during their travels, would forward copies of them to the Map Curator, by whom they will be acknowledged. Should the donor have purchased the photographs, it will be useful for reference if the name of the photographer and his address are given.

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EXPLORATIONS THROUGH THE INTERIOR OF THE LABRADOR PENINSULA, 1893–1894.*

By A. P. LOW, B.S., Geological Survey of Canada.

The overland expeditions made in connection with the search for the north-west passage, in the early part of the present century, by Sir John Franklin, have given the public a good idea of the northern portions of America to the westward of Hudson's Bay. This knowledge has been further supplemented by the information obtained by the expeditions sent out in search of Sir John Franklin, under such competent explorers as Sir James Richardson, Admiral Back, and Dr. Rae. The country to the east of Hudson's Bay, embracing the Labrador Peninsula, with an area of 289,000 square miles, owing to the prevalent opinion that it was practically an inaccessible, barren waste, has been slighted by the geographical world, and only within the last few years has any attention been paid to its systematic exploration.

The Hudson's Bay Company have had small posts scattered throughout the interior of Labrador since the commencement of the present century, and the various officers in charge of these posts must have had a good knowledge of the country, which, unfortunately, they rarely made public. The only account of the interior of Labrador, from the pen of a Hudson's Bay Company employé, was that of John McLean, who, being in charge at Ungava Bay, traversed the country between that place and Hamilton Inlet several times between 1839 and 1842. A record of his journeys is printed in his book, entitled, 'Notes of a Twenty-Five Years' Service in the Hudson Bay Territories.'

Until 1870, the Canadian government undertook no explorations beyond the southern watershed. In that and the following year, expeditions were organized by the Geological Survey, to explore Lake Mistassini, situated just beyond the southern watershed, and drained by the Rupert river into Hudson's Bay. These explorations were only partly successful, and gave no definite knowledge of the size of the lake. Nothing further was done until 1884, when another expedition was sent to complete the survey of Lake Mistassini; this was accomplished in 1885, and the Rupert river was also surveyed by the writer to its mouth on James Bay.*

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* Communicated by permission of the Director of the Geological Survey of Canada. Map, p. 612.

The next explorations of the western part of the Labrador Peninsula were made in 1888, when the Big river was ascended 200 miles from its mouth, and a traverse made from there northward to the Great Whale river, which was descended to its mouth; afterwards a survey was carried inland, from Richmond gulf to Clearwater lake. †

In 1887 Mr. Randal Holmes ‡ ascended the Hamilton river to Lake Winokapau, where he was obliged to turn back for want of provisions. Two years later, two parties from the United States, incited by the accounts of the Grand Falls, ascended the same river, and succeeded in reaching the falls within a few days of each other.§

In 1892 I received instructions to explore the lower part of the East Main river, with a view to its fitness for a boundary between the province of Quebec and the unorganized territories of the dominion.

The present paper is an account of the continuation of this undertaking in 1893–1894. The exploration of the East Main river was continued upward to its head, and from there the country was traversed northward to Ungava Bay in 1893; and an exploration of the Hamilton river, from its mouth inland to its head, in the centre of Labrador, was made in 1894. Because of the great extent of the country traversed, it is necessary, in such a paper as this, either to deal largely with the incidents of travel at the expense of the principal facts noted, or to devote attention almost wholly to the latter. Although aware of the difficulties inseparable from the last-mentioned treatment, it has been adopted in the following pages, in the hope that the added amount of information which it is thus possible to condense into a given space, may be of greater value than a more readable narrative.

Acting under instructions from Dr. Selwyn, Director of the Geological Survey, and accompanied by Mr. D. I. V. Eaton, as assistant and topographer, I left Ottawa on June 5, 1893, for Lake St. John, at the end of the railway line, 190 miles northward of Quebec, where we commenced our canoe trip. Stops were made on the way, at Montreal and Quebec, to complete outfit. At the former place, through the kindness of Mr. Chipman, Commissioner of the Hudson's Bay Company, I was furnished with circular letters to the officers of the Company's posts in Labrador, enabling me to obtain the necessary information and aid to carry out the work in hand. As it is impossible to obtain provisions or supplies of any kind at the Hudson's Bay posts inland, and as all the able-bodied men belonging to them are away to Hudson's Bay, where they are engaged bringing in the next season's supplies to their posts, a supply of provisions sufficient for the whole trip had to be taken from Lake St. John. To transport these provisions and the outfit, we had two Peterborough canoes, 19 feet long, built of cedar, and each capable of easily floating a load of 1000 lbs. together with a crew of three men; along with these was a smaller cedar canoe and three others of birch bark. Four young Indians were engaged for the entire trip, and eight others to assist in the transport up the rapid streams to Lake Mistassini, some 250 miles away.

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* *Report Geol. Surv. Canada*, 1885. † *Ibid.*, 1888.

‡ *Proc. Royal Geog. Soc.*, April, 1888.

§ *Bul. Amer. Geog. Soc.* 1892; *Bul. Geol. Club*, Philadelphia, 1894.

Lake St. John was left on June 17, and the Ashuapmuchuan river was ascended to its forks, where the Chéf river was followed a few miles to the Sapin Crôche branch, and thence up to its head in File-axe lake, near the height of land. From there a number of small lakes were passed through in crossing the watershed, and the Perch river was descended into the south-east bay of Lake Mistassini, where we arrived on July 2.

The only new exploration along this part of the route was from the forks of the Chéf river to File-axe lake, some 60 miles.

Along the Sapin Crôche the country is over one-half burnt, and is grown up with small black spruce, Banksian pine, aspen poplar, and white birch. Where unburnt the same trees are found, along with larch and balsam spruce. These are generally small, and seldom exceed 12 inches in diameter. The larch are all dead or dying from the ravages of the imported European larch gad-fly, the limit of its depredations now extending northward to the East Main river. The country towards the height of land is traversed by ridges of low rounded hills, with swampy lands and small lakes filling the valleys between.

About the southern part of Lake Mistassini the country is nearly flat, and is covered with a much larger growth of trees than is found in the region between it and Lake St. John. This is probably due to the superiority of the soil about the lake, which overlies bedded limestones; whereas in the rest of the region the soil is sandy drift, resting on gneiss and granite. From Mistassini the eight men with three canoes returned to Lake St. John, as no offer could induce them to go further. In consequence we had to depend on the natives of Mistassini for aid. Two old men and a small boy were found willing to go some distance with us. One of the old men had years ago made a trip to Nichikun, and as he was supposed to still know something of the route, he was engaged as guide to that place. The other old Indian and boy were hired to take a load to the East Main river; but, as they were too feeble to carry loads on the portages, they were sent back from the outlet of the Rupert river.

At the Hudson's Bay post at Mistassini I was fortunate enough to get a small rough map of the route up the East Main river to Nichikun from a servant, who had formerly been employed at Nichikun. This map was our only guide for some 250 miles, as the old Indian had forgotten the route, and proved utterly useless as a guide. The Hudson's Bay post was left on July 5, with the entire outfit in one bark and three wooden canoes, the former being only used for a few days. From Mistassini to the end of the survey of 1892, on the East Main river, Mr. Eaton, the old man, and myself paddled one of the canoes, the four men being in the other two. Beyond this point to Nichikun Mr. Eaton was engaged making the survey, and consequently was transferred to one of the larger canoes.

From the Hudson's Bay post the lake was followed northward some 50 miles to a small bay on the west side, where a short portage was found leading to the Rupert river, which discharges from the lake some 10 miles to the northward. A short distance below the portage the river separates into two channels, about equal in volume, that do not unite again for upwards of 100 miles. The eastern channel was followed northward 50 miles, to where it passes through a long lake, and there turns westward to join the other channel. The river throughout flows swiftly along in a channel from 100 to 600 yards wide, nearly on a level with the surface of the surrounding country, and is greatly obstructed by small rocky islands. The country passed through is rolling, with low, rounded, rocky hills covered with a scant growth of small black spruce and Banksian pine. The route continues northward from the end of this lake, and for 25 miles passes through small lakes and streams, connected by ten portages, to Clearwater lake. These portages average over half a mile in length, and are all very bad, as they either pass through swamps or over ridges of boulders, where walking with heavy loads is difficult and at times dangerous.

Clearwater lake is an irregular body of water 15 miles long, with numerous bays. Its discharge flows northward through a flat country for 25 miles, and empties into the East Main river, about 300 miles above the mouth of the latter stream. Above the junction the East Main river is one-third of a mile wide, and continues so for 25 miles to the forks of the Tichagami branch, a large stream flowing from the south-east.

Five miles above the forks the survey of 1892 ended; and this point was reached on July 15. A micrometer survey was carried from here up the East Main river, 104 miles, to where the route to Nichikun leaves the main stream, and follows a small branch flowing in from the northward. The general course of the river for this distance is slightly north of east.

The stream is very rough and rapid, with sixteen portages past chutes and rapids, besides a number of places where lightened canoes were tracked up. The valley of the river is shallow, and often the stream flows almost on the level of the surrounding country. The average breadth of the river is 400 yards, and it is often quite shallow. Two large branches flow in on the south side, and one on the north side, together with a number of smaller streams.

Beyond where the Nichikun route turns off the main stream bends sharply to the south for some 20 miles; it then turns north-east, and enters a high range of hills that extend eastwards for over 100 miles. Among the hills the river splits into a number of branches, the discharges of many large lakes in that region. Along the river the country on both sides is low, with rounded hills of granite and gneiss, from 100 to 300 feet high. These hills run in ridges, east and west, parallel to the strike of the rocks. Beyond the sixtieth mile the hills become lower and the valleys wider, and they are occupied by sharp ridges of till, parallel to the direction of the glacial striæ (N. 85° W.).*

Above where the route leaves the river the country continues comparatively flat, towards the south and east, to the base of the mountains some 30 miles away. The trees along the East Main river are small, and do not average more than 8 inches in diameter. Black spruce is most abundant, and is found along with larch, Banksian pine, balsam spruce, and straggling white birch and aspen poplar. The highest hills, where unburnt, are wooded to their summits, and the only barrens are those caused by fire. More than half of the country has been burnt over, leaving only the bare rock or trees of small second growth.

The rocks along the river are all Laurentian in age, and are represented by mica schists and gneisses, along with large masses of hornblende granite.

The glacial striæ are well marked on all rock exposures along the river; their direction is constant, showing the ice-movement to have been from S. 85° E., or towards Hudson's Bay. Boulders in great numbers are scattered indiscriminately over hill and valley, and are often found perched on the very summits of the rocky hills.

The branch by which the Nichikun route leaves the main river is very small, and for 30 miles its general course is from east-north-east. It is then left by a portage route that passes for 25 miles in a north-east direction, through five irregular lakes on various small branches of the river, with portages between, to the height of land between the East Main and the Big river, which also empties into Hudson's Bay. Great trouble was experienced in finding the route through these lakes, as they were marked like a string of beads on the map obtained at Mistassini. The character of the country and trees between the main stream and the watershed is similar to that already described.

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* Bearings throughout are all astronomical.

The water in the lakes is remarkably clear and cold, and they are all abundantly stocked with white fish, lake and brook trout, carp, and pike.

At the height of land a portage is made to a lake 5 miles long, which discharges into the Big river. The Big river below this point alternates between lake expansions and narrows. At the narrows, where it has a current of 5 miles an hour, it is quite deep, and is about 200 feet wide. It comes from the southward, where it rises in a number of lakes on the northern slopes of the mountains about 60 miles distant.

Ten miles down the river enters a large lake, and almost immediately passes out again into another lake, and then, by a short rapid, enters Lake Nichikun. The Hudson's Bay post is situated on an island near the entrance of the river, where we arrived on August 4.

The establishment consists of some half-dozen buildings of small logs covered with boards cut with a pit saw, which is also used to make the boards used for the interior finishings. The buildings are each about 12 feet square, and comprise a master's house and kitchen, men's houses, and various storehouses. Only thirteen families of Indians are attached to this post, and, together with the twenty-five families of Mistassini, include all the Indians who trade in the interior. These do not represent half of the Indians that inhabit the interior of Labrador, as the greater number of them prefer to journey with their furs to the coast, where the trade prices are much higher.

Lake Nichikun is about 30 miles long, and in its widest part about 5 miles across. It has a number of deep bays, and its extent cannot be appreciated, on account of the many islands scattered over its surface. The lake is surrounded by granite hills from 300 to 600 feet high, with their higher summits barren.

About Nichikun black spruce is abundant, and the largest trees will square 6 inches for 12 feet. Next in abundance comes larch, followed by balsam spruce. White spruce, Banksian pine, and white birch are not common; and aspen poplar and mountain ash are very rare.

At the Hudson's Bay post a manuscript map was obtained, showing Lake Nichikun and the various rivers and lakes of the northern, western, and southern watersheds of Labrador. This map was made here in 1842 by Thomas Beads and John Spencer, and it proves a valuable addition to the topography of the interior.

Through the kindness of Mr. Jos. Iserhoff, who is in charge of the post, much valuable information was obtained from the Indians concerning the geography and natural history of this region. Nichikun was left on August 7. The outfit was now carried in two cedar and a small bark canoe paddled by two old Indians, who were engaged as guides to Lake Kaniapiskau. This lake lies about 80 miles to the north-east of Lake Nichikun. The route leaves that lake by the middle of its three discharges, and follows down the main stream 25 miles.

It then turns more eastward, and ascends a small branch for 30 miles, passing through a chain of lakes on that stream. Crossing a narrow height of land, a small stream is descended through two small lakes into a large lake; and Kaniapiskau lake is reached by a short portage from the east bay of the last lake, which discharges into the great lake some miles to the northward.

The country between Nichikun and Kaniapiskau is higher and more rocky than any previously passed through, and as the greater part of it is burnt, leaving bare rock thickly strewn with boulders, the region has a very barren, desolate aspect. The tops of the highest granite hills are barren, and the trees in the valleys are small black spruce and larch, with very few straggling white birch.

Lake Kaniapiskau is upwards of 40 miles long from north to south, and is divided into two parts by a narrows close to the base of a barren, cone-shaped hill, from which the lake takes its name. A large stream flows into the south end of the lake, and is said to rise in Fox lake to the southward, out of which a tributary of the Manikugan river also flows southward into the St. Lawrence. The shore-line of Kaniapiskau is very irregular, being deeply indented with bays. Islands are numerous in the southern half, especially along the east side, where the land is comparatively low. There are two outlets to the lake, that join 5 miles below, where the river is a quarter of a mile wide, with a rapid current and shallow channel full of large boulders.

Our guides left us at the discharge, and in consequence the two remaining canoes were very heavily loaded. In running the second rapid of the Kaniapiskau branch of the Koksoak river, a short distance below the lake, one of the canoes struck on a rock and upset. By this accident we lost all our meat except 80 lbs. of rotten bacon, along with many other articles of provision and equipment, and made the remainder of the journey under considerable disadvantage, besides losing a day to repair the canoe and dry the outfit saved.

For 50 miles below Lake Kaniapiskau the river flows north-west. It here has no distinct valley, and runs nearly on the level of the surrounding country, and consists of a succession of lake expansions connected by short rapids, falling over masses of boulders. The surrounding country is low and comparatively flat, with rounded ridges of hills at intervals. Towards the lower end of this course the river begins a long descent, with heavy rapids and small chutes.

Turning abruptly to the east, it enters a narrow valley bounded by almost perpendicular hills of granite, at first about 200 feet high, but rising to 400 or 500 feet, as the river descends in a continuous heavy rapid for over 10 miles, where it varies in width from 100 to 200 yards. The rocky banks are covered with tightly packed boulders, from 30 to 60 feet above low-water mark, showing the height to which the water and ice rise in the spring. For 20 miles below there is a succession of rapids with smooth water between, where the river widens to half a mile and becomes very shallow. The hills continue to rise, and along the lower part are often 600 or 700 feet high, while the bottom of the valley is fully 200 feet below the general level. The upper parts of the higher hills are barren, and the trees in the valley are very small black spruce and larch. The glacial striæ about Kaniapiskau show the ice-movement to have been from S. 20° E., or down the slope towards Ungava bay, and this northern direction was noted in many places along the river below.

Turning now to the northward, the river continues in that direction 50 miles. The surrounding country gradually lowers, until the river is only slightly below its level. Passing a large branch from the south-east called Sandy river, the river falls over a number of granite ledges, and, contracting as it descends, finally falls through a shallow gorge about 50 feet wide and a quarter of a mile long. Two miles below it again contracts, and passes into a crooked cañon about 300 feet deep and 100 feet wide, with overhanging walls. Here in a mile the river falls nearly 350 feet, and at the lower end of the gorge it is over 200 feet below the general level. Below this fall the river for 5 miles is narrow and has a very swift current; but after passing another large tributary, flowing in from the south-east, called Good-wood river, it widens to nearly half a mile, and again becomes a succession of shallow rapids, with short smooth intervals between, for 70 miles. Descending a fall of 80 feet, the river again contracts to about 100 yards, and for nearly 20 miles flows with a strong current in a narrow crooked valley, with perpendicular rocky walls rising in places 1000 feet above the stream.

Issuing from this valley, the river widens out and becomes very shallow for 10 miles, when a large branch from the westward, called Death river, is passed, and the river enters a long lake from 2 to 4 miles wide, surrounded by sharp rugged mountains, often upwards of 1000 feet high. This lake is named Cambrian lake, and is over 25 miles long, and gradually contracts into a river at its lower end, where another large branch, called Ice-dam river, joins from the westward.

On this lake a series of sandstones, limestones, and shales, associated with irruptive rocks, replace the granites and gneisses previously passed through, and which do not again appear along the river to within 75 miles of its mouth. This new series of rocks is remarkable from the great quantities of associated iron ore, in the form of bedded silicious siderite, hæmatite, and magnetite. These ores often occur in great masses, and the exposures noted along the river-shore are estimated to hold millions of tons of iron. These rocks are met with along the river for 120 miles. Five miles below the lake the river falls 60 feet in a long chute. A large branch, called Swampy-bay river, comes in from the eastward 5 miles below the chute, and is used by the Indians as a route to old Fort Nascaupee, on the head-waters of the Hamilton river.

The river now flows nearly north for 70 miles, to its junction with a very large stream from the westward, named Stillwater river, which, like all its other branches, is yet unsurveyed. Between the Swampy-bay and Stillwater branches, the river flows through a wide valley bounded by sharp hills, and varies in width from a quarter of a mile to two miles, the average being about half a mile. Eight miles above the mouth of Stillwater river there is a narrow gorge, cut out of the shales and limestone, about 2½ miles long, and less than 100 yards wide, through which the river rushes with heavy rapids. The only other obstructions to navigation, between the forks, are two falls of 60 and 80 feet, the former cut out of shales, the latter over broken ledges of flat limestone. Below the Stillwater branch the river widens to over a mile, has a swift current, and is very shallow, with numerous low bars. The valley is considerably wider, and the hills forming its walls run in sharp ridges from north to south. They slope gently towards the east, and have overhanging cliffs facing the opposite direction. Their height gradually lowers as the river is descended, from 800 feet to less than 500 feet, some 30 miles below the junction of the two main branches. At this distance the Laurentian gneisses are again encountered, and the hills continue to lower and spread out, leaving a wide, flat valley, through which the river flows rapidly. It continues quite shallow, and has many large, low islands of sand and shingle, while it varies in width from 2 to 4 miles, with low banks. About 5 miles above Fort Chimo the low rocky hills approach the river, and it is obstructed by several rocky islands, that extend to within 2 miles of the Hudson's Bay post. From there to its mouth, some 20 miles, the stream is from 1 to 2 miles wide, with high rocky banks.

The rise of tide at the mouth of the Koksoak river is about 40 feet, and its influence is felt to a rapid nearly 60 miles inland. Along the lower part of the river, the ebb and flow runs with a current from 6 to 7 miles an hour, and is a source of danger to navigation with any but steam craft. The trees along the middle river are much larger than about its head or mouth. White spruce trees 18 inches in diameter are not uncommon in the river bottom about Cambrian lake, and below it to the last falls. Balsam poplar is also met with along that part of the river, and the black spruce, larch, and white birch are all larger than any noted further up stream. Out of the valley and on the sides of the hills the trees are small, and the summits are barren. The tableland on both sides of the valley is also barren; small black spruce growing only around the lakes and in protected valleys. Below the Stillwater branch the trees again become very small, and the white spruce and birch thin out, leaving only black spruce and larch. About Fort Chimo these last grow only in protected valleys between the low gneiss hills. The Leaf river, a stream that enters Ungava Bay from the westward, about 20 miles north of the mouth of the Koksoak river, marks the northern limit of trees; beyond that stream, nothing but small willows and Arctic plants are found.

Fort Chimo was reached on August 27, and our canoe trip of over 1200 miles across Labrador was accomplished. Of this distance 450 miles had been previously surveyed, leaving 750 miles for the season's work. Of this 104 miles were surveyed with a Rochon micrometer and large traversing compass, with frequent check observations with a sextant for latitude and variation of magnetic needle. The remainder of the distance was either measured with a Massey boat-log on the lakes, or with time-estimations, by Mr. Eaton, on the rivers. As the direction of this part of the survey was practically north and south, the frequent observations taken for latitude acted as an efficient check on the estimations; and these together afford a fairly accurate survey, as was found when the map was compiled.

The Hudson's Bay Company steamer *Eric* arrived from Churchill three days later, and passage was taken in her for Rigolet, on Hamilton Inlet. Fort Chimo was left on September 10; and George river, a large stream flowing into the south-east corner of Ungava Bay, was reached next day, and ascended some 20 miles to the Hudson's Bay post. This river is about a mile wide, and is bounded on both sides by rugged hills of granite, often 500 feet high, with only a few stunted trees of black spruce growing in low protected valleys. The next stopping-place was Nakvak, on the Atlantic coast. Here the coast is extremely rugged; the mountains of syenite rise in sharp peaks from 2000 to 4000 feet above the sea, and have their upper portions unglaciated.

Davis Inlet, on the same coast, was next visited, where the mountains are much lower, and are glaciated to their summits.

Rigolet, situated at the narrows 40 miles above the mouth ot Hamilton Inlet, was reached on October 1. Arrangements were immediately made with Mr. Wilson, of the Hudson's Bay Company, to forward by boat our supplies for the coming year to Northwest river post, near the head of the inlet. We then proceeded in our canoes along the north shore of the inlet, and arrived at our winter quarters on October 13. The Indians were from here sent forward, with instructions to proceed as far up the Hamilton river as possible before the river became frozen over, and then to await until the ice was sufficiently strong to allow them to descend on it. They succeeded in ascending the river 120 miles, and returned to the post on December 30.

Mr. Eaton and myself remained during November and December at Northwest river, where Mr. Cotter kindly shared his bachelor quarters with us, and where we passed a pleasant and comfortable time, working up the surveys and notes of the past season. Late in December

I made a trip to Rigolet, with a dog-team, in search of men to assist in hauling loads of provisions inland, and returned with eight men on January 15. Four days later, under the command of Mr. Eaton, a party of seventeen men started inland, each hauling on a long narrow toboggan 200 lbs. of provisions, together with a share of the necessary camp outfit. The shortness of the daylight and the extreme cold rendered work at this season very difficult. Notwithstanding these drawbacks, Mr. Eaton succeeded in reaching the foot of the Gull rapids, 70 miles above the mouth of the river. Further progress was barred by the rough ice in the rapids, as yet not well covered by the small quantity of snow fallen. The provisions were safely stored here in a cache of logs, and the party returned to Northwest river, after an absence of twenty days.

While Mr. Eaton was away, I accompanied Mr. Wilson to Rigolet; and from there to Cartwright, located on Sandwich Bay, about 80 miles to the southward; and returned to Northwest river early in February.

Owing to the lack of snow, the final start inland was not made until March 6, when, assisted by extra men, making a total of sixteen persons, we again left, each man hauling a load of 200 lbs. on a small sled 7 feet long, and shod with hoop-iron. Mr. Cotter accompanied us with his dog-team as far as Gull rapids, and materially assisted in the transport.

Above the câche considerable difficulty was encountered in passing the heavy masses of ice, that filled the river from shore to shore for nearly 10 miles. Beyond this the travelling was very good to within 20 miles of Lake Winokapau, where the valley narrows, and the current is so rapid that the stream never freezes over.

Slow progress was made along the narrow sloping margin of ice near the water's edge for 10 miles, until further travel with sleds became impossible. The loads were stored in another câche here, and the party returned to the lower one, for the remainder of the provisions left there. On the way up, the canoes were taken out of winter quarters about 10 miles below the upper câche, and drawn on sleds to that point. The provisions, outfit, and sleds were loaded into the canoes, and they were then poled and tracked up the remaining 10 miles to the lake. This proved a disagreeable and dangerous undertaking, as the temperature of the air was from 5° to 10° below zero, and the river was full of anchor ice. The men, working in the canoes, were able to grip the ice-covered poles only with their bare hands, and were all more or less frost-bitten.

Lake Winokapau was reached on March 30; and it was then decided to discharge the extra men, and to depend upon the permanent party of six to continue the transportation. The loads were increased to between 300 and 400 lbs.; but such was the quantity of provisions and outfit, that at first four, and subsequently three loads each were necessary to move it.

The mode of travel until May 19 was as follows: from camp a load would be taken ahead from 12 to 15 miles, and there secured on the bank of the river, after which the party would return to camp. Another load would be brought forward to the same place next day; and so on, until the load containing the camp equipment only remained, when a move ahead would be made, and the camp established some 12 or 15 miles above the provisions. These would be brought to the camp and then transported ahead in the same manner. These trips backward and forward, together with those below Lake Winokapau, made a total of over 1200 miles' travel on foot, more than half of which was accomplished while hauling loads. Mr. Eaton and myself, besides assisting in the transport, carried a micrometer survey upwards from the mouth of the river to the Grand falls.

Hamilton Inlet is the largest of the many long, narrow bays or fiords that indent the Atlantic coast of Labrador. Its greatest length is slightly over 150 miles from east-north-east to west-south-west, and its average width is 12 miles. Forty miles from its mouth it narrows to less than 2 miles, and divides into two bays, of which the southern is the longest. The narrows is about 6 miles long, and above the bay again widens out, and varies from 4 to 16 miles. The country surrounding the inlet is high and rocky, especially along the south shore, where a range of barren hills, called the Mealy mountains, rise abruptly from 800 to 1200 feet above the bay.

Three large rivers flow into the head of the inlet. The Northwest river comes in on the north side, some 15 miles from the head of the bay. At its mouth this stream is upwards of 100 yards wide, with a strong current and a deep channel. It flows through a long lake near its entrance to the inlet, and rises in Lake Michikamau, some 250 miles to the north-west. Almost opposite the mouth of the Northwest river, another large stream empties into the inlet from the south-west. It is called the Kenamau river, and flows down from the tableland with continuous shallow rapids, that render it quite unnavigable. The Hamilton river empties into the head of the inlet, and occupies a wide valley, apparently the continuation of that of the bay. This is the most important and largest river of the eastern watershed of Labrador. Its drainage basin extends westward, almost halfway across the peninsula, and has a breadth of upwards of 200 miles.

Owing to the great difference in physical character, the river is naturally divided into two parts at the Grand falls, some 250 miles inland.

The lower portion flows in a distinct valley, cut out of gneisses and granites, where the river, at present, is from 500 to 1000 feet below the general level of the surrounding country. Above the Grand falls the river flows on the surface of the tableland, and there descends into the valley with a sudden drop. From its mouth to the junction of the Minipi river, 80 miles up, the general course of the river is west-south-west. The hills forming the walls of the valley are from 3 to 4 miles apart, for 60 miles from its mouth.

The valley is partly filled with sandy drift, out of which the river has cut a shallow channel nearly a mile across, except at the Muskrat falls, 27 miles above its mouth, and at two rapids further up. The Muskrat falls have the form of a low chute, a quarter of a mile long, with a total drop of 70 feet. This is the only place, below the Grand falls, where rock in place is seen in the river-bottom. The banks of the stream are always sandy, and are often high and steep, with terraces cut into the drift at different levels, up to 200 feet above that of the river at present.

The trees along this part of the river-valley are large for a situation so far north. White spruce 2 feet in diameter and 70 feet tall are not uncommon; and black spruce trees, though not so large, are of sufficient size to afford good commercial timber. Balsam spruce, white birch, and both aspen and balsam poplar, are all common, and grow to 15 inches in diameter.

At the Gull rapids, 60 miles up, the valley is less than half a mile across, with almost perpendicular walls that rise from 400 to 800 feet directly from the river. The channel varies from 100 to 400 yards in width, and for 19 miles is occupied by continuous rapids.

The Minipi river pours in with heavy rapids, through a narrow valley at the head of this stretch. It discharges a considerable volume of water, gathered from a number of large lakes on the tableland to the south-west of its mouth.

From the Minipi river to the Grand falls the general course of the main valley is west-north-west. Above this branch the valley of the main stream again opens up, and the hills, for upwards of 25 miles, are from 1 to 2 miles apart. The channel along this part varies in width from a quarter to half a mile, and only in a few places is the stream broken by small rapids.

The surrounding country, from near the Gull rapids to beyond the Grand falls, has been traversed by numerous fires, the last of which burned throughout the summer of 1893, sweeping away the forests in the valley and on the tableland on both sides, and leaving only bare sand and rock, or small second-growth trees.

Beyond this stretch of quiet water the hills once more approach, narrowing the valley to less than a mile. Several sharp bends in the direction of the valley occur in the next 30 miles, where in places it is less than a quarter of a mile across, with its rocky walls rising directly from the narrow shores. The hills are nearly all bare and rocky; and at the upper end, where the river flows out of Lake Winokapau, they rise in vertical cliffs 1000 feet above the water. As the river is ascended it becomes narrower, with increasing current, so that the last 6 miles to the lake is a continuous rapid, with three heavy pitches.

Lake Winokapau fills an expansion of the river-valley from 1 to 2 miles wide and 35 miles long. The water of the lake is remarkably deep, and two soundings, taken about halfway up in the middle, gave 406 feet and 417 feet. On account of the thickness of the ice (4 feet 9 inches), no other soundings were made. This great depth is taken to represent the level of the valley previous to the Glacial period, during which period the river-valley was everywhere blocked with drift, except along the portion occupied by the lake, where, from some cause unknown, no deposit of glacial drift was laid down. At the head of the lake a little branch, called the Elizabeth river, joins from the westward. At its mouth a small Hudson's Bay post was formerly situated. Above the lake, for 35 miles, to the foot of the portage route past the Grand falls, the character of the river and valley remain unchanged. The latter has a number of gentle bends, and varies from half a mile to a mile in width, with the river-channel filling about half of its bottom, where the river flows between banks of drift with a steady current of about 3 miles an hour.

Above the portage the valley quickly narrows to less than a quarter of a mile, and is full of sharp bends. Down it the river rushes in a continuous rapid for 9 miles, from the mouth of Bodwoin cañon, where the main stream pours into the valley from a narrow gorge on its north side. The valley above the cañon continues on towards the north-west.

Above the forks it is occupied by a stream having less than one quarter the volume of the river that issues from the gorge. The smaller stream flows from the westward, out of Lake Ossokmanowan, which also has another outlet into the main river. Eight miles in a straight line north-north-west of the mouth of the cañon, the main branch of the Hamilton river issues from a small lake expansion, almost on a level with the surface of the surrounding tableland, and commences the greatest and wildest descent of any river in Eastern America. The lake is 1660 feet above sea-level, and the valley at the mouth of the gorge is 900 feet above the sea; consequently, in 12 miles the river falls 760 feet.

The volume of water passing down is great, and is estimated to average 50,000 cubic feet per second. From the lake, for 4 miles, the river rushes along in a shallow channel, filled with boulders that break the water into heavy rapids, with a total fall of 95 feet. In the next mile it descends 110 feet, in a narrow trough cut out of solid granite, with steep sloping walls, down which the river pours in a tremendous rapid. As it descends, its width decreases from 150 to less than 50 yards; and in the last 300 yards, where the grade is very steep, the waters rush along with a deafening roar, in a white swirling mass, thrown into great long waves that are at least 20 feet from crest to hollow. With a final huge pent-up wave, the great mass of water is shot down a steep incline of rock for 100 feet, where it breaks into a mass of foam, and then falls freely into a circular basin, 300 feet below the crest of the fall. The momentum acquired in the descent of the incline is sufficient to carry the water well out from the foot of the vertical wall of rock at the bottom. The Indians believe that the space so made is the abode of the spirits of two Indian maidens, who were accidentally carried over the falls. On this account, or more probably because of the awe inspired by the grandeur of the surroundings, and the enormous power displayed in the rush of water and the thunderous roar, the Indians who hunt in the vicinity cannot be induced to visit either the falls or the cañon below.

The basin into which the river precipitates itself is nearly circular, and about 200 yards in diameter. It is surrounded by perpendicular rocky walls 500 feet high, except where the river enters and flows out. At the time of our first visit (May 1), these vertical walls were completely hidden under a thick coating of ice, formed from the condensation of the great column of spray that rises high above the level of the top of the falls. The lower half of this ice-covering was in the form of gigantic icicles, presenting in the sunlight a beautiful display of iridescent colour, through shades of blue, green, and yellow, that contrasted strongly with the dead white of the upper portion. At the head of the falls a small bottle was found containing records of the visits of Messrs. Cary and Cole, and Bryant and Kenaston, who ascended the river in 1891.

The river leaves the basin by a narrow cañon at right angles to the falls. This cañon is less than 100 yards wide at the top, and has almost vertical rocky walls. It runs in a zigzag manner for 6 miles, until it ends in the main valley. Along its bottom, 500 feet below the surface of the surrounding country, the river, less than 100 feet wide, rushes with a continuous rapid, and falls 260 feet while passing through the canŏn.

The portage route past the falls leaves the valley on its north side, and in a quarter of a mile rises 700 feet, where it ascends the steep wall of the valley. It then continues 2 miles, to the first of a chain of small lakes, connected by twelve portages, that lead to the lake expansion of the river above the falls. Great difficulty was experienced in the ascent of the steep hill with the provisions, sleds, canoes, and outfit, as at the time it was covered with ice and slush, rendering it, in places, almost impassable.

Sled-travel was abandoned on May 19, owing to the rotten state of the ice on the smaller lakes; and, having established a camp on the banks of one of them, we waited there until the 27th, when work was resumed in canoes. This at first was exceedingly dangerous in the main river, where the thick blocks of ice from the lakes above ran freely until June 5. Besides the large blocks, the water was covered with sharp needles of ice from 2 to 3 feet long, which, unless great care was taken, would have quickly penetrated our thin canoes advancing against the strong current. The ice was jammed in several rapids, past which portages were made. In two places the ice moved down the rapid while we were making the portage, and we had a lively time getting canoes and outfit away from danger over the moving mass.

Our ascent of the river at this time was due to an appointment made with an Indian, whom we had previously met, and who had agreed to meet us at the second lake of the river on June 1.

Above the Grand falls the character of the river changes completely; it no longer has a distinct valley cut deep into the surrounding country, but flows nearly on a level with the surface of the plateau, where it spreads out and fills the depressions between the low ridges of rock or drift that are arranged in echelon over the country. In passing around the ridges, the river is often broken into several channels by large islands, and in other places, where the valleys are wide, it forms long island-covered lakes, with deep narrow bays. The river is so broken into channels and lakes, that it is next to impossible to follow the main channel without a guide.

The current no longer flows steadily, but alternates between short rapids and long lake stretches. The general course of the stream is parallel to the ridges and the glacial striæ (west-north-west) from the falls to Lake Petitsickapau, 100 miles above. All these features give to the upper portion of the river an aspect of newness, and show its present course and conditions to have been determined by the post-Glacial configuration of the tableland. From the end of the portage-route to Sandgirt lake, 45 miles above, the river passes through two small lakes, connected by stretches of rapids, where many islands divide it into a labyrinth of channels. The surrounding country has been largely burnt over, leaving many barren areas. The standing trees are very small and stunted, and, except close to the river, grow in open glades. Black spruce everywhere predominates, with larch balsam spruce, and white birch growing in favourable places.

Sandgirt lake owes its importance to its situation, rather than to its size, as it is only 12 miles long and 8 miles wide. The river here divides into two main branches: the Ashwanipi branch, flowing in from the north-west; and the Attikonak branch, from the south. Beside the routes by these streams, another from Lake Michikamau to the north-east centres here. A number of families of Indians congregate here in the spring, to await the breaking up of the ice, after which they descend in a body to Mingan, on the Gulf of St. Lawrence, where they trade their furs.

Owing to the necessity of making two loads against the strong spring freshets, our progress to this place was slow, and we did not arrive until June 15. On account of its favourable situation for exploration in various directions, a câche was constructed on one of the islands in the lake, where all extra supplies and outfit were stored.

The survey was then carried up the Ashwanipi branch, for the accomplishment of which a month's time and provisions were allowed. This stream is the larger of the two branches, and varies from 200 to 500 yards in width, as it flows swiftly along for 30 miles from where it issues out of Birch lake. The surrounding country is very similar to that already described. From Birch lake upwards, the aspect of the country alters, on account of a change in the underlying rocks.

The iron-bearing series, previously met with along the Koksoak river, now replace the gneisses, and continue westward beyond the bounds of this exploration. Sharp parallel ridges of rock, with irregular outlines, now rise from 300 to 700 feet above the general level, and are separated from one another by wide, flat valleys. The upper parts of these ridges are treeless, and are covered only in part with white lichens or small shrubs, including the northern cranberry (*Vaccinium vitis-idæa*), which grows everywhere in profusion through the barrens. It is an important article of food, owing to the lasting quality of its fruit, and its improvement by frost, so that it continues excellent until late in the summer.

From the summit of any ridge, a fine view of the surrounding country is obtained. The wide valleys between the ridges are almost wholly occupied by long irregular lakes, covered with islands, and broken into deep bays by low ridges of drift. These lakes are joined together by a network of streams, so that canoe-travel is possible in any direction when the country is known. Otherwise much time is lost going up the wrong bays and channels, as was the case with ourselves, when looking for the main stream in the lakes immediately above Birch lake, where ten days were spent in useless search before the stream was finally found.

The change of rock is accompanied by a marked improvement in the size of the trees, due to the increased richness of the soil. White spruce 30 inches in diameter and 40 feet tall are common in the river-valley, where they grow along with black spruce 2 feet in diameter. Balsam spruce and larch are also abundant, together with white birch and a few clumps of balsam poplar. The extreme cold of winter, and the cold northern winds at all seasons, have greatly stunted the growth of the trees, and their height does not correspond with their girth.

Among the small fruits found in this portion of the interior may be mentioned two species of red currants (*Ribes rubrum* and *R. prostratum*) abundant everywhere; the common raspberry (*Rubus strigosum*) and the arctic raspberry (*Rubus Arcticus*); the wild strawberry (*Frigaria Virginiana*) is not plentiful; two kinds of blueberries (*Vaccinium uliginosum* and *V. Pennsylvanicum*) grow in profusion everywhere; the wild cherry (*Prunus Pennsylvanicus*) is commonly found growing on old burnt land, along with two varieties of ***Amalanchier Canadensis***, which also grow in the wooded areas.

Above Birch lake, which is 10 miles long, the river is divided into three channels, that unite again 12 miles above, in the next or Dyke lake. This is the lowest of a network of large lakes connected by short rapids. At its north-west end, 20 miles above its outlets, a small, deep narrows, mistaken by us for the main stream, leads into Lake Petitsickapau, where the Hudson's Bay Company formerly had an outpost called Fort Nascaupi. The ruins are still to be seen on the shore of the lake. This lake is 25 miles long, and 10 miles across in its widest part. It is exceedingly shallow, and is divided into four deep bays at the north-west end. Only a narrow ridge separates it from Attikamagen lake, at the head of the George river, emptying into Ungava Bay.

The inlet of the main stream is on the south side of Dyke lake, near its north-west end, where a short rapid connects it with the next long lake above, whose inlet is at its south end, opposite the outlet.

There is here another short and strong rapid connecting with the next lake. The inlet of this lake is 15 miles to the southward, where another short rapid from the west leads to another long lake, separated from the last only by a narrow ridge. This lake was followed in a north-west direction for 12 miles to its end, where the river enters, after passing down 5 miles of rapids from Menihek lake. This portion of the route, like the description of it, was very bewildering, especially as we were always looking for the river in the northern bays of the lakes; and not until they were thoroughly explored did we think of searching in the opposite direction, or almost doubling on our former course.

Menihek lake is another of these long narrow lakes, and varies from 1 to 2 miles in width. From its outlet due south to where the river flows in its length is 50 miles. A high barren ridge of hills bounds its west side.

The southern end of the lake marks the change from the iron-bearing series of rocks to the gneisses, and the country surrounding the river above it again corresponds to that below Birch lake.

The river for 24 miles, to where the survey ended, has a strong current, with frequent rapids, being there 75 yards wide and 6 feet deep. About 50 miles above the end of the exploration, it flows out of Lake Ashwanipi, a large irregular body of water, upwards of 50 miles long, situated just north of the watershed dividing the Hamilton river from the streams flowing southward into the Gulf of St. Lawrence.

The survey was not carried to the head of this lake, owing to the time lost in search of the river below, and the consequent lack of both time and provisions to complete the work in such a large irregular lake as Ashwanipi was known to be. After marking the end of survey, we returned down-stream and reached Sandgirt lake on July 18. Before leaving this part of the river, attention must be again drawn to the immense amount of rich iron ore seen about the shores of the lakes, which can only be estimated by millions of tons.

Another important item of unexhaustible wealth is that of the fisheries of the lakes and river, and the remarks on this subject apply to all the waters of the interior of Labrador. The river stretches swarm with brook trout, from 3 to 6 lbs. in weight, and afford as fine fishing as can be found in Canada. Along with the trout are numbers of land-locked salmon, from 1 to 5 lbs. in weight, together with large white fish, pike, and two species of carp. In the lakes all these kinds are taken, along with lake trout up to 40 lbs. in weight, and, if the Indians are to be believed, often to twice that weight.

The next exploration from Sandgirt lake was in a north-east direction, 65 miles to Lake Michikamau. We started on this trip with supplies for twenty days; but, owing to favourable weather, we returned on July 30.

The route to Michikamau leaves Sandgirt Lake by its northern discharge, which is descended a few miles to Lob-stick lake, a large body of water with several deep bays. Passing to its eastern end, a small stream was ascended a short distance into a large lake dotted over with myriads of small rocky islands, with a second similar lake beyond, from which a portage leads to the water flowing into Lake Michikamau.

As an example of the intimate connection between the head-waters of the various rivers of Central Labrador, it may be mentioned that the valley along which the portage passes is occupied by a small lake, that discharges either northward into Lake Michikamau, or southward into the Hamilton river, according to the direction of the wind. When Lake Michikamau is above its normal level, in the spring, a large stream carries part of the overflow into the Hamilton river by this valley, and no portage is then necessary to pass from the Hamilton to the Northwest river.

From the portage, the route passes east for 15 miles; the first half is through a lake, followed by a short stretch of river, into a long narrow bay of Lake Michikamau. This, the "Grand Lake" of the Indians of Eastern Labrador, is well worthy of its name. It is 70 miles long, and 20 miles across in the widest part, with an average width of 10 miles. Its longest axis extends from south-east to north-west. While Michikamau is considerably shorter than Mistassini, its expanse is not dwarfed by large islands and long points like the latter; and the high rocky hills that surround it add much to the beauty of the lake, and contrast favourably with the low shore-line of Mistassini.

The country about the lake and along the route is very similar in character to that already described, except that the ridges of drift are wanting over many areas, and, in consequence, the low rounded hills of gneiss are more marked.

Lake Michikamau is on the limits of the continuous forest belt. To the northward of it, stunted spruce and larch grow only in protected valleys, around the margin of lakes and watercourses. The remainder of the surface is either bare rock strewn with boulders, or else covered with dwarfed willows and shrubs, or white lichens, giving the landscape a naked and uninviting appearance.

The Northwest river flows out of Lake Michikamau on its north side, about 30 miles from its north-west end.

Returning to Sandgirt lake, the câche was emptied, and a final start was made on August 1, up the Attikonak branch. This stream flows out of a large lake of the same name, some 75 miles to the south-south-east of where it joins the main stream. Its volume, where it enters Sandgirt lake, is about one-half that of the Ashwanipi branch at the same place. The river has a strong current, with numerous rapids, for 11 miles, to its outlet from a long narrow body of water 45 miles long, called Lake Ossokmanowan. This lake has a second outlet on the east side, whose volume is about equal to the branch ascended. The second outlet passes eastward down the main valley, and joins the main stream at the mouth of Bodwoin cañon. South of Lake Ossokmanowan for 26 miles, to Lake Attikonak, the river flows with rapid current, except where it passes 5 miles through a lake.

Lake Attikonak is another of those large, irregular bodies of water that cover more than one-third of the surface of the interior tableland. Its appearance is dwarfed by the number of islands that dot its surface in all directions. From its outlet to the head of its south-east bay, the distance is 36 miles. A short portage route leads from this bay to the Romaine river, which flows southward into the Gulf of St. Lawrence. Where the route joins it, this stream is less than 100 yards wide; and a short distance below enters, and for 35 miles passes through, four lakes, connected by short rapids. These are called the Burnt lakes, and derive their name from the total destruction by fire of the forests surrounding them. From Sandgirt lake to the outlet of the lowest Burnt lake, the country is low and rolling like that already described.

Below the lakes the river assumes its proper character, and flows swiftly down a valley from half a mile to two miles wide, with steep granite walls that rise from 300 to 800 feet above the surface of the stream. The valley has been partly filled with drift, out of which the river-channel is cut, the former levels of the river being marked by the terraces that are now seen at different elevations up to 100 feet above the surface of the water.

The river was followed downward 45 miles, to where it takes a sudden bend to the eastward, and soon passes into a narrow gorge between high rugged hills of gabbro. In this gorge it falls with continuous heavy rapids, and is quite impassable with canoes. If such were not the case, the Indians would never use the portage route that leads from the Romaine to the St. John river. This route follows a number of small lakes and streams in deep, narrow valleys between rugged hills of gabbro, that rise nearly 3000 feet above sea-level, or considerably higher than the general level of the interior tableland. The total length of the route is 65 miles, with thirty-one portages, in all 19½ miles long, and together forming the longest and worst portage route in any part of Eastern America.

Before reaching the St. John river, the general level of the country falls more than 1500 feet. This river has a valley from half a mile to two miles wide, with steep rocky walls. Down the valley the river flows rapidly as it winds from side to side, and is only broken by one small fall until it empties into the Gulf of St. Lawrence, about 40 miles below where the portage route joins it.

We arrived at the mouth of the river on August 22, after an absence of nearly six months from any base of supplies, during which 906 miles of micrometer survey and 280 miles of track surveys were made. These surveys have since been mapped, and the manner in which they tie with previous surveys reflect great credit on Mr. Eaton, to whose careful work the accuracy is due.

The practical and scientific results of the exploration, beyond the additions to the geographical knowledge, may be summed up as follows: All the exposures of rock along the various routes were examined, and a large quantity of information was obtained in regard to the relations of the various rocks that make up the Archean complex, which occupies over nine-tenths of the area of Labrador. A great area of supposed Cambrian rock, which can be correlated with the iron-bearing rocks of Lake Superior, was discovered extending from latitude 50° north-westward to, probably, beyond the west side of Ungava Bay. Many interesting facts were gathered in regard to the ancient configuration of this great area, along with others relating to the glacial phenomena. Among these may be mentioned the evidence of a confluent ice-cap over Labrador, except on the highlands along its north-east coast, and that the movement of the ice was everywhere outwards from the central interior towards the coast.

Large collections of rocks, minerals, plants, birds, birds'-eggs, and insects were brought home. These, in conjunction with the notes taken, will add greatly to the knowledge of the natural history, and the distribution of life, animals, and plants, in these regions.

Meteorological observations were regularly kept, together with notes on the thickness of ice, snowfall, and other subjects bearing upon the climate. About 250 photographs were taken to show the characteristic features of the country passed through, and other subjects of interest.

The elevations of different points along the routes have been partly worked out from barometrical readings taken in conjunction with station barometers at Northwest river and on the island of Anticosti. The elevations already determined are marked in blue on the accompanying map.

A more detailed report on the country and its resources is being prepared for the Geological Survey of Canada, along with a map of the Labrador Peninsula, on a scale of 25 miles to an inch, which will allow the geographical features to be shown with greater completeness than is possible on the map to accompany this paper.

THE LUCHU ISLANDS AND THEIR INHABITANTS.*

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The Luchuan theatre is among the things which apparently no previous traveller had seen, and yet it has an interest of its own for the student of Far-Eastern culture, showing as it does something similar to what the Japanese stage was at an earlier period of its development. In fact, the present Luchuan dramatic performances stand in the position of a rustic first cousin to those mediæval Japanese lyrical dramas, called *Nō-no Utai* and *Nō Kyōgen*, which I described and translated specimens of, some thirteen years ago, in a little work entitled 'The Classical Poetry of the Japanese.' The inner form of the "house" is sometimes the same—a square stage with seats for the audience round three sides of it, while to the left, at the back, a sort of gallery or bridge leads to the green-room. The chief difference is that the front of the stage has an upper storey with a window. Whereas the Japanese *Nō* theatre is patronized chiefly by the aristocracy, who alone can understand the obsolete poetic dialect in which the pieces are written, its Luchuan poor relation attracts the lower classes. The spectators squat on rather dirty matting, which is stretched anyhow on the uneven wooden boards, the back part being raised a little to enable those behind to see. People eat and smoke and come and go, and children play and cry, unmindful of the actors. Tickets for the whole day cost only three or four cents at the lower-class theatres, except in certain reserved places. The first time I went I could not gather any very definite impression from the mixture of much singing and dancing and little dialogue, except that the play was taken from the ancient native history, for the title was stuck up on a placard on the stage. But later on, a better occasion offered—a party to a theatre of higher standing, joined in by one of the young Luchuan princes and by the leaders of Nafa society, both native and Japanese. The thoughtful kindness of our host had supplied us foreigners (that is, the Japanese and me) with a Japanese version of the libretto, so that we could easily follow what went on. There were twenty pieces in all during the day. As before said, they reminded me of the Japanese lyric dramas and their comic interludes. In all the plot was simple, founded in the former class on some pretty little legend, and partaking in the latter of the nature of burlesque and practical joke. Some of the stories were familiar Japanese friends; for instance, that of 'The Elves and the Envious Neighbour,' so charmingly translated by Mitford in his 'Tales of Old Japan.' Others were original. Part of each play was sung by an invisible chorus, and invariably there was dancing. Sometimes the dancing was itself the *pièce de résistance*, and was very rhythmical and pretty, much of it posturing, none of it so rapid and violent as the ballet-dancing of Europe. As a rule, the dancers numbered four, or some multiple of four. The musical instruments used were the banjo, the flute, and the drum. These were really *played*, not deafeningly banged, as is the case on the Chinese stage; and the music seemed a degree nearer to that of Europe than either Chinese or Japanese music is. It was, however, monotonous enough, certain short phrases being repeated to satiety. What I have here called a "banjo" is known in Luchu as the *jamising*, and is covered with the skin of a large snake. From this Luchuan *jamising* the better-known Japanese *shamisen* was derived in the seventeenth century; but it is not impossible that the Luchuan instrument itself may be comparatively modern, and have been influenced *viâ* Fuchau by a Spanish or Portuguese original. The music played on the *jamisen* and *shamisen* is decidedly less Oriental in character than that performed on other Luchuan and Japanese instruments.

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* Paper read at the Royal Geographical Society, January 7, 1895. Map, p. 408. Concluded from the May number.

With the Luchuans of the higher class, the composition of Chinese and Japanese verses is a favourite pastime, and as Japanese versifiers some of them attain to high excellence. Poetry in the native tongue is mostly left to the rustics, each Luchuan village cherishing certain stanzas that have been handed down in praise of the limpid stream, the monumental tree, the pure air, or whatever other special perfection may, in the patriotic conviction of the inhabitants, justify the claims of their particular home to be the fairest spot on earth. Besides these local patriotic poems, there are also, of course, love-songs in the vernacular—for what language could long exist without such? The favourite Luchuan stanza consists of four lines, whereof the first three have eight syllables, and the fourth has six syllables, an arrangement differing from any adopted by the poets of China or Japan.

Picnics form another favourite amusement of the upper and middle classes, as noticed long ago both by Basil Hall and by Perry. Horse-races of a primitive type are also in vogue. Besides these, there would seem to be those games of chequers, chess, and others, which are common to the whole Far-Eastern region, and, indeed, to the civilized world at large; but such specially European games as billiards and cards, though now firmly domiciled in Japan (indeed, the Japanese soon learn to play billiards better than Englishmen do), have not yet invaded the little southern archipelago. Of children's sports, the only one I took much notice of was kite-flying.

Every spare moment of my stay at Nafa was devoted to an earnest study of the language, and this it was which kept me so much tied to that city; for one of the two interpreters whom the Governor's kindness lent me for part of each day proved a most intelligent guide in this matter, and as such was not lightly to be parted from by one the chief object of whose visit was philological inquiry. The language had never been grammatically studied before. The only so-called helps were a very stilted Japanese-Luchuan conversation book published for use in the Government schools, and a short vocabulary by Lieut. Clifford appended to Captain Basil Hall's work,* the latter a fearful and wonderful production—mere "pidjin," in fact, and of no practical assistance. This is not the place to enter into details. Such will be published later on in a more appropriate place. Suffice it here to state that the Luchuan language proves to be related to Japanese in about the same degree as Italian is related to French. Though mutually quite unintelligible, and though there are considerable divergences both in the phonetic system and in the details of the grammar, the structure of the sentence is practically identical, as is the case with French and Italian, and a study of each language throws vivid light on the other. The verb, which is the most important part of speech in all languages of the Mongol type, retains archaic characteristics in Luchuan which had already disappeared from the earliest Japanese known to us—that of the eighth century after Christ. An unfortunate result of the political overshadowing of Luchu by its two great neighbours, China and Japan, has been the habit of using the Chinese and Japanese languages for literary purposes, almost to the exclusion of the native tongue, which neither the Chinese ideographs nor the Japanese syllabary are well fitted to express. The Luchuans have no perfect written system of their own. There existed, however, till recently, and perhaps still linger in the Further Isles, two rough methods of recording thought for certain practical purposes, of which no notice has hitherto reached Europe. One of these is the ideographic writing of the islands of Yonakuni. The following signs for common objects of barter are in use:—†

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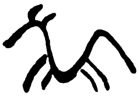
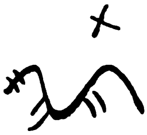
* Dr. McLeod's volume on Luchu gives the same in an abridged form.

† The small characters between the picture-writing and the English translation are a translation into Japanese.



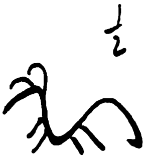
羊

Sheep



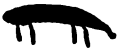
馬

horse



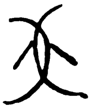
牛

cow



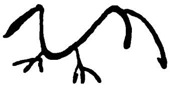
豚

pig



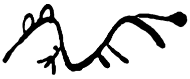
魚

fish



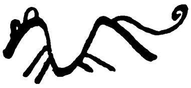
鶏

fowl



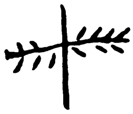
猫

cat



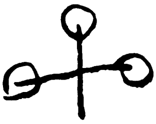
犬

dog



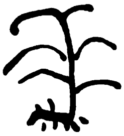
人参

Carrot



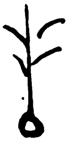
牛蒡

burdock



ラッキョ

scallion

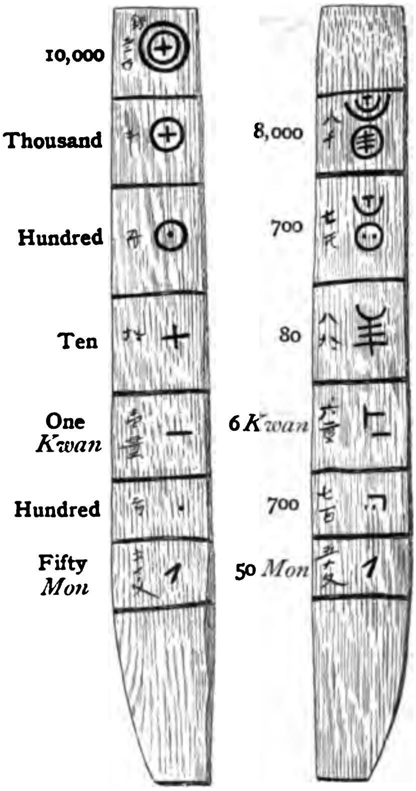


ヒル

garlic

The interest of these symbols to the student would be greatly enhanced if he felt himself justified in deeming them the result of really original thought. That the inhabitants of so remote an islet should, without assistance from the great world, have solved for themselves the problem of representing ideas to the eye, would be astonishing indeed. But we cannot with safety jump at such a conclusion. It is more natural to suppose that the islanders, though unable to read Chinese, had heard of the existence of the Chinese ideographs, and had even perhaps seen specimens of them, and that, the idea being thus suggested, they began to work it out practically for themselves. This is rendered probable both by what has happened in other parts of the world, where a vague knowledge of the European alphabet has produced native scripts somewhat resembling it, and by the form of one or two of the Yonakuni ideographs themselves, especially that for person , which recalls the Chinese 人. Numbers were indicated in an original manner. For instance, whereas a rough circle meant "one egg" or "eggs" in general, as figured above, "ten eggs" was written , and "twenty eggs" .

The other kind of writing peculiar to Luchu, and known as *Shō-chū-ma*, had a wider importance. It was current in the rural districts of Great Luchu and in the Further Isles, especially Miyako-jima, among those incapable of writing the Chinese character. The figures composing it used to be inscribed with charcoal or any other available material on sticks, which served as local financial records, setting forth the amount and assessment of taxes and other kindred matters. Thus most of them represented numbers. I reserve for the *Journal of the Anthropological Institute* a detailed discussion of six specimens of *Shō-chū-ma* preserved in the Anthropological Institute of the Science College of the Imperial University of Japan, but am enabled meanwhile, through the kindness of the curator, Professor Tsuboi Shōgorō, to submit to the Royal Geographical Society a facsimile of one of them. The larger figures to the right are alone original, the smaller ones to the left being a Japanese (Chinese) interpretation added afterwards.



The system possesses, as will be observed, different forms for the numerals, according to the article counted. Thus "a hundred," as applied to the smaller money value called *mon*, is represented by a dot; but when a hundred of the larger denomination *kwan* has to be written, we find the dot surrounded by a circle. The most noticeable feature, however, is the mutilation of 十, "ten" (the current Chinese and Japanese ideograph for that number), to denote "five," which latter appears sometimes as ㇇ (*i.e.* half ten), sometimes as 丅 or ⊦ (*i.e.* ten with one limb missing). The numbers between "five" and "ten" are formed by the addition of dots or lines to "five." The ideograph for "eight thousand *kwan*" exemplifies both these characteristics of the system, it being a compound of the ideograph for "myriad" cut in two, and of that for "thousand" increased by the change of one transverse line to three, that is, 8000 is represented by half ten thousand (*i.e.* 5000) + 3000. Similarly 700 is half a thousand (*i.e.* 500) + 200. Most of the specimens of *Shō-chū-ma* are larger than the one herewith presented, and are more fully inscribed. Some of the larger sticks have their four sides apportioned as follows:—one for the money account, one for the rice account, one for the firewood account, and the fourth for the name of the village, which latter is inscribed in Chinese characters. In these the name of each household liable to contribute is indicated by a peculiar mark of his own.

To end this part of the subject, it should be stated that the Luchuans are also credited with having used knotted cords (*quipos*) for keeping accounts in very ancient days. It is, of course, well known that their neighbours the Chinese did so.

While Great Luchu has been brought into close relations with Japan for nearly three centuries past, the Further Isles have remained much more isolated. The first time any of the natives reached Tokio was in December, 1893, when some of them came to present a petition to the Diet on some matter connected with taxation. Mr. Kada Tei-ichi's and Mr. Tashiro Yasusada's printed accounts of these islands show the manners of their inhabitants to be sufficiently similar to those of Great Luchu to warrant applying the same description to both, unless one were to go into very minute details—same food, same houses, same religion, same territorial divisions. A like remark applies to Oshima on the north, where the tattooing and peculiar coiffure of the women is as Luchuan in character as is the vegetation that stamps its *cachet* on the physical aspect of things. Note, however, the following peculiarities communicated to me by officials of long experience in the Further Isles. Owing to the luxuriant forests on some of these islands, the people there burn wood to cook their food with. Animal food, too, is more abundant, especially chickens. Much tobacco is grown there, Yaeyama alone having exported 40,000 lbs. in 1893. The women wear a dress called *kakam*, somewhat resembling the *hakama*, or divided skirt of the Japanese, secured at the waist by a string which runs round it as in pyjama trousers. Above this they wear a sleeveless tunic. The females of the lower class are intrepid riders, sitting sideways on the saddle after the European fashion, a whip in one hand, and their marketings slung over the back in a basket. When a woman is pregnant, she occasionally eats dog's flesh. Immediately after delivery a fire is lighted in the room, however hot may be the weather, and both mother and infant are placed as close as possible to it for the space of a week. Also the friends and relations assemble, and make loud music all night and every night with drums and other instruments, so that the poor creatures cannot get a wink of sleep till daylight comes. It would seem that this barbarous custom was also formerly observed in Great Luchu, though it has now there fallen into desuetude. According to a most circumstantial account which I received from the Japanese Mayor of Shuri, infants on Yonakuni are carried on the mother's back in a sort of sling called *tsikumyā*, which is hung round the mother's neck as in the accompanying figure. My somewhat long-winded informant waxed quite eloquent over the advantages of this arrangement, which, according to him, deserved to be known and imitated not only in Japan, where women inappropriately carry their babies on their back and thus cannot suckle them, but all over the world. Strange to say, another friend, Mr. Tamura Kumaji, who has lived on the Further Isles for seven years, declares that no such custom has any existence! This is, however, the only Luchuan item as to which I have found authorities differ. The above few particulars concerning the Further Isles must suffice for the present. I only note them in case of my being prevented from carrying out a cherished plan of again visiting Luchu, and making a lengthened stay in each of the principal islands.

I found social life at Nafa and Shuri very pleasant. The upper classes there have not much to do; they read little, and move about little, so that they have plenty of time for entertaining each other. It so happened, also, that the Governor and the Chief Inspector of Police, who are the two principal officials of the archipelago, were leaving, and I shared in some of the entertainments that were given in their honour. I was sitting alone at my inn on the evening of March 11, when a message came from Prince Shōjun (or Matsuyama, as the Japanese commonly style him), third son of the ex-king, to say that he wished to see me. I went, accompanied by the Inspector of Police, to the place indicated—a tea-house in Nafa—and found the prince attended by two of his nobles named Ie and Tama-Gusiku. There was no formality about the conversation, which was carried on in Japanese, of which language the prince, who was partly educated at Tokio, is a perfect master. One of his attendants, too, spoke Japanese fluently; the other could only say a few words. A good deal of the talk had reference to the visit of my grandfather, Captain Basil Hall, in 1816, of which a local record is still preserved. A day or two later I paid visits at the houses of my host and his attendants. The exterior of such Luchuan mansions is not striking, and the gate remains always inhospitably shut. Once within, however, the visitor finds himself in an atmosphere of courtesy nowise inferior to that of Japan. The disposition, too, of the apartments, with their mats and ornamental hanging scrolls, recalls Japan, and every one sits on the floor, *more japonico.* But a curious peculiarity is the presence in the court just outside the reception-rooms, which are of course open to the outer air in this delicious climate, of cages containing fighting cocks that keep up an unpleasant crowing. The charming female servants of Japan are absent, their place being taken by men, who, with deep obeisances, bring in tea and somewhat dubious cakes. Nowhere was a woman to be seen, though many were the heads of men and boys peering round corners and over screens as we passed in and out. After this there were many comings and goings, days spent together at the theatre, and so on. Our grandest field-day was one Sunday, when, after military games by the soldiers of the Japanese garrison who are quartered in the castle of Shuri, we—that is, the Prefect, the Chief Inspector of Police, the military Commandant, another officer, and I—were bidden to a grand feast in Japanese style by Prince Shōten (also called Naka-Gusiku from the name of his estate), the ex-king's eldest son, whom we found attended by his brother Shōjun and two or three of the principal nobles. Unfortunately our delicate, amiable-looking host, whom I took to be about thirty years of age, could speak no language but his own. So, as our Luchuan was neither copious nor fluent—indeed, the only word some of the party knew was *chura-kāgi*, which means "a pretty girl," and is generally among the first expressions new-comers to Luchu learn—all we could do was to smile and pledge each other in innumerable cups of *saké* (a Japanese liquor made from rice, and tasting rather like weak sherry). The younger prince, however, and some of the others were ready to chat away in the most unconventional manner; and the party went off right merrily, an æsthetic diversion in the middle of the proceedings being caused by the entrance of an artist, who drew in sepia whatever subject was proposed to him by the guests. There was also some composing of verses and writing of scrolls by the assembled company.

The perfectly Japanese character of this whole entertainment—food, conversation, manners, everything—might have led one to suppose that our Luchuan hosts knew of no other way of living. The only un-Japanese feature was that each of us was invited to partake of a thimbleful of a very strong Luchuan liquor out of a tiny cup of pure gold. Quite another vista, however, was opened out a few days later, when a charming old nobleman, named Yonabara, bade us to a feast in the Chinese style. No more squatting on the mats this time, but stiff-backed chairs *à la chinoise*. No more of the familiar Japanese fish and rice and seaweed soup, but richer and more complicated Celestial dishes served in twelve courses with an elaborate *menu* in Chinese. This feast was intended to be an exact counterpart of that which it was the custom to offer to the Chinese ambassadors who used to come and present the congratulations of the court of Peking on the accession of each new Luchuan sovereign. Some of the robes then worn were brought out—gorgeous red and green silks. But as it was only play this time and not reality, our hosts did not don these robes themselves. Some extremely bewitching singing-girls were present to help on the feast with native music, and these the son of the house playfully dressed up in the gorgeous Chinese robes, producing a charming effect.

Two or three days after this dinner in Chinese ambassadorial style, the day of parting came, when the Prefect, the Chief Inspector of Police, several officers of the garrison, and myself embarked on board the steamer *Mutsu Maru*, that was to carry us home to Japan. Our late host presented us each with an ode in faultless classical Japanese. The lines addressed to myself ran as follows:—

Onozukara
  Kami ya mamoran
Watatsumi no
  Nami-ji mo kaze mo
  Kimi no mani-mani.

Which, being interpreted, means—

Surely must
The Gods protect thee,
Inclining to thy behest
Both the breezes and the wave-path
Across the ocean.

The deck was crowded with friends come to say farewell; and as we rounded Nammin Point, this castle-like coral rock was seen to be alive with people waving adieux to us with their green parasols, after the peculiar Luchuan fashion. The last impression I received of Great Luchu was from its white, glistening grave-vaults on the green hill-sides. Then night fell, and in the brilliant moonlight island after island rose up in clear-cut outline as we sped rapidly northward over a sea of glass.

APPENDIX.

ON THE NAME LUCHU.

The etymology of the word *Luchu* is obscure, and so far as orthography is concerned, both native* and European spelling exhibits a remarkable variety of usage.

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* The Chinese are responsible for the native spellings, their system of writing being authoritative in Luchu as in Japan.

Each of the combinations 流虬, 瑠求, 流求, 流球, 留求 琉球, which give the same Chinese sound *Liu-K'iu*, or *Liu Ch'iu*, and even 流鬼 which sounds rather differently, has the authority of ancient and respectable authors. The earliest of these various forms, 流虬, which occurs in the Chinese annals of the seventh century, means literally "a floating hornless dragon," and is explained by reference to the likeness in shape of Luchu to a young dragon floating on the surface of the waves. The Chinese were quite capable of bestowing such a name on the archipelago or one of the islands composing it; and the identification of Luchu by the Japanese with the *Ryū-gū* 龍宮, that is, "Dragon Palace," or palace of the sea-god of their mythology, which is supposed to lie somewhere below the waves, points to a cognate idea. I incline to think, however, that all the combinations of characters employed to write the sound *Liu-K'iu*, or *Liu-ch'iu*, are but attempts to represent phonetically syllables whose original signification had been forgotten before the introduction of the art of writing. The name may possibly be a survival from days when a race different from that now dominant there tenanted the archipelago. One thing alone is clear, namely, that the word *Luchu* is not Luchuan. Neither is it Japanese; for the use of the letter *l* (with its equivalents *r* and *d*) at the beginning of a word is contrary to the phonetic rules of both these kindred tongues. The characters now generally adopted are 琉球, which the Luchuans pronounce *Duchu*, while the Japanese call them *Ryuky*. The standard English spellings, *Luchu*, *Lewchew*, or *Loochoo* come to us from the pronunciation current in North China—*Liu-ch'iu*, according to Sir Thomas Wade's system of transcription—while the French *Liou-Kiou* represents the pronunciation of South China (*Liu-k'iu*). Early Spanish and other voyagers wrote the word in an astounding variety of ways—*Lequeos*, *Lequio*, *Liquejo*, *Loqueo*, *Liu-Kiu*, *Licou-Kieou*, to which later compilers have added *Lieuchieux*, *Lieukieu*, *Lewkew*, *Lutschu*, *Liow-tcheow*, *Lioe-kioe*, etc., until the student feels perfectly bewildered. All these spellings, however, widely as they may differ to the eye, can be traced to the fairly uniform pronunciation of Chinese interpreters. Here in Japan, during recent years, some Europeans of strong pro-Japanese leanings have adopted the Japanese pronunciation, and spell *Ryūkyū* or *Riukiu*. They have not even shrunk from the perpetration of such English and Latin (?) adjectives as *Riukiuan* and *Ryukyuanus!* For my own part, I fail to see the advantage of mixing up politics in such matters, and I adhere to the spellings *Loochoo* or *Luchu*, not as being the best imaginable if we now had to write of the place for the first time, but because they are those which have been most generally employed by English writers and cartographers for nearly a century past. The Royal Geographical Society prefers *Luchu*, the British Admiralty charts vary between *Luchu* and *Liu Kiu*, the Japanese Admiralty chart No. 34, probably out of deference to English usage, has *Liu Kiu*.

Curiously enough, the Luchuans themselves make but scant use of the name by which their country is known to the world at large. They have, as already explained, separate designations for each island, the chief island being almost invariably spoken of as *Uchina*, a name of which the Japanese *Okinawa*, used officially to denote the whole archipelago exclusive of the northern sub-groups, preserves a more archaic form. The characters employed to write it are 冲繩, the meaning of which is "sea-rope," given—so tradition asserts—on account of the likeness in shape of this island to a bit of rope floating on the waves; but whether this popular etymology has any serious claims to attention may be doubted. Another ancient Japanese, and perhaps also native, name for the archipelago is *Uruma*, which seems to be preserved in *Haderuma* (that is, "Extreme Uruma"), the southernmost and nearly the furthest of the group. Of this name Uruma, no etymology is forthcoming.

In spelling the other Luchuan place-names that occur in this paper, I have consistently followed the Japanese pronunciation, chiefly because that is now the dominant one likely to survive in charts and in postal and telegraphic usage, partly also because the Shuri (Great Luchuan) pronunciation is widely departed from in the Further Isles, and one would, therefore, be involved in a maze of difficulties if one endeavoured to give the local pronunciation in each case. The Japanese pronunciation, on the other hand, is uniform and easily ascertained, and the orthography, now almost universally employed by resident Europeans for transliterating it, agrees almost exactly with the system recommended by the Royal Geographical Society. The sole difference is in the use of a line over certain vowels (e.g. ō, ū), to mark, *not tonic accent*, but long quantity, the distinction between long and short quantity being absolutely essential both in the Japanese and the Luchuan languages.

Before the reading of the paper, the PRESIDENT said: The paper we are assembled to hear this evening, on the Luchu Islands, is by one well able to give us valuable and good geographical information. Mr. Basil Hall Chamberlain is a most eminent linguist and philologist, especially as regards the languages of the far East; he is also a sound geographer. I regret we shall not be able to welcome him here this evening, but I am glad to say Major Darwin has kindly undertaken to read the paper for Mr. Chamberlain.

After the reading of the paper, the following discussion took place:—

Mr. SEEBOHM: My only claim to speak upon the Luchu islands is that during the last ten years I have been in correspondence with collectors of birds in Japan, and I have received several collections from these islands, and have written several papers upon the birds of this group of islands. There are one or two very interesting facts connected with them. The main islands which have been visited have been the northern and the central groups; the southern group is practically unknown ornithologically, and I must say that the visits have been very cursory, and I don't think we know anything like the full numbers of birds which are to be found there. Up to the present time there are no fewer than twelve species of birds which have already been discovered, and which are peculiar to the Luchu Islands. One of these, perhaps the most interesting, is a very handsome woodpecker, and this has been considered so extremely distinct from every other species that our great authority upon the woodpeckers has created a genus for its reception. Now, the geographical interest of these facts lies in this, that although the islands have been described this evening as having been partly of coral formation and partly volcanic, it is quite evident, from the bird-life upon them, that they must be extremely old. On the British Islands we have only one species of bird which is peculiar to them, and this is so extremely closely allied to a species in the north of Europe that it is very little evidence in favour of the separation for any long time of the British Islands from the Continent. Now, the existence of a bird generically distinct on the Luchu Islands shows that they have been for a very long time separated from the mainland. I am sure that we have listened with very great interest to the most valuable and important paper which has been read to us this evening, and we must all express our great thanks to Major Darwin for the excellent way in which he has read it.

Admiral Sir JOHN HAY: As a visitor to the Luchu Islands fifty years ago, I should like to express my great gratitude to Mr. Chamberlain for this most valuable paper. I do not wish to detain the Society, but I should like to point out how little change has taken place in the Luchu Islands since Captain Basil Hall, the grandfather of the present writer, visited them to the present time; and, looking to

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the wonderful changes in Japan, one is surprised that the change has not spread over the subsidiary group, to which Japan will shortly, if it does not now, claim entire suzerainty. I had very little opportunity while there of examining or seeing much of the country; I travelled a little way, but not far. The admirable roads struck us all as marks of civilization. One would hardly have expected such a massive building as that in which the Prince of Luchu was concealed, like the Shogun of Japan, always invisible; it was a building of such massive structure that it would have required very heavy artillery to take it. However, that was not necessary, as they showed us the greatest possible civility, and were more than kind; but I must confess that that kindness was not extended by the ladies, who, although they may have seen us, did not take the opportunity of allowing us to see their charms. I thought, as one who had visited Luchu, it would be unfair if I did not thank Mr. Chamberlain for his paper.

The President: I am much obliged to Admiral Sir John Hay for having told us he has been to Luchu, for very few naval officers have the opportunity of visiting these islands. I am sure we have all listened to Mr. Chamberlain's paper with great interest; it is comprehensive, and when you have the opportunity of reading it you will find it exhaustive—such a paper as one would expect from the grandson of our old associate, who first gave us in our boyhood an account of these islands. Mr. Chamberlain's grandfather, Captain Basil Hall, the first modern writer on the Luchu Islands, was one of the earliest members of the Raleigh Club, which was the forerunner of this Society, and one of its most active members. He was also a member of the first Council of our Society, and I think that the occasion of this paper by his grandson being read before the Society should be taken as an opportunity for commemorating the great debt which geographical literature owes to Captain Basil Hall. That gallant officer and scientific seaman obtained for his books a place in the classics of British literature, through his admirable accounts of many distant lands, and through the thoroughness, elegance, and finish of his style. When I was a midshipman, and it was my all night in, I used to take Captain Hall's 'Fragments' into my hammock with me and read them by the light of the sentry's lantern. I think you will all feel it is an interesting coincidence that we should find his grandson following in his footsteps, in writing so graphic and lucid an account of the very islands the account of which served to build up the literary fame of his grandfather, Captain Basil Hall. We all, of course, regret that Mr. Chamberlain should not have been with us this evening, and I am sure that you will all join with me in a cordial vote of thanks for his valuable paper, and also a vote of thanks to Major Darwin for his kindness in taking so much trouble in preparing it and reading it to us.

UPON A VISIT TO TSAVO AND THE TAITA HIGHLANDS.

By C. W. HOBLEY.

What follows is a short account of a journey to Tsavo and the mountain district of Taita, in the latter part of the year 1892. The start was made from Mombasa on September 21, with a small caravan of about 25 men all told. The ordinary route to the interior was taken by way of Mazera, Mwachi, and Taro. As there was at this season no water between Taro and Ndara, a distance of about 50 miles, a halt of one day was made at Taro in order to send on water ahead into the middle of the plain for the use of the caravan. A number of large tins containing water were sent on to near Maziwa Mitatu, and by the help of this water Maungu was passed, and the camp Mkuyuni on the east side of Ndara mountain was safely reached. This stretch between Taro and Ndara, commonly known as the Taro plain, is a vast area covered with fairly open thorn scrub, composed of varieties of the acacia and large numbers of very light sponge-wood trees. These sponge-wood trees have only one use: if an incision is made in the bark, a whitish treacly substance immediately exudes; this solidifies in the sun, and forms a bright amber-coloured bleb of gum arabic. Now, this supply is at present entirely untouched, though it doubtless will not be long before it is added to the list of products of the country.

From Ndara a track running round the north end of the mountain to Ndi was followed, and from Ndi the Tsavo river was reached in one day. Around the north end of Ndara there are vast thickets of the Nkongwe aloe, each leaf being a long fleshy spike almost circular in section and often 4 feet in length; the fibre prepared from the leaf of this plant, beaten out and dried, makes beautiful silky rope largely used by the natives, and one day this product of the desert will also be utilized. It is very happily situated, for there are large numbers of the Taita people resident near by who would readily gather and dry this substance if they could find a market for the fibre.

From Tsavo a three days' journey was made to the upper course of the river in the direction of Kilimanjaro; around Tsavo station on all sides is dense, thorny jungle, so that it may be imagined it was not an easy matter to follow the course of the river. At one time there was a very well-marked Masai track, but naturally, since the building of the station, this track has fallen into disuse and become almost obliterated. At intervals of a few miles, prominent rocky ridges of pink gneiss traversed the country in a north and south direction, the river having cut for itself a channel through which to pass, with steep walls of rock on either side; each of these ridges meant a step in general contour of the country—a series of rapids of small falls being present in the river at these points. The river is usually only 70 or 80 feet wide, and abounds in fish of three kinds—a flat mud-fish of the Siluroid family, similar to those found in the Tana; silvery scaled fish something like perch; and occasionally eels are seen. Crocodiles inhabit the river, but not in large numbers. Water-buck abound along the banks, and numerous rhinoceros tracks lead down from the bush to the river. The banks of the river are fringed with dense groves of the hyphæne branching palm, the baobab (*Adansonia*), the mkindu or *Phœnix* palm, the miware or *Raphia* palm, and the large umbrella-shaped acacia is also found along the banks of the river. The baobabs are nearly all stripped of their bark by the Wakamba, who carry it away to make their beautiful woven baskets for carrying grain, known as chondos. The whole of this district is a Wakamba hunting-ground; several of their camps were seen, and occasional parties met with. About two days' march brought us opposite the range marked on Ravenstein's map as *Theuka*. This mountain, viewed from the east or west side, has a most striking appearance; the lower half of the mountain is clothed with dense forest, the upper half is a mass of crags of pink gneiss, which terminate in a jagged serrated line of sharp peaks, but, upon reaching the south end of the range, it is found that these crags really run up into a sort of knife edge; the shape of the mountain from the south being that of an acute angled triangle, set upon a more obtuse angled pedestal, the forest-covered pedestal being mainly composed of an accumulation of talus or débris from the crags above. It was not possible to identify the range by the name Theuka, for neither the Wakamba nor the Wataita knew of the mountain by this name; the Wakamba called the mountain by the name Ngovi.

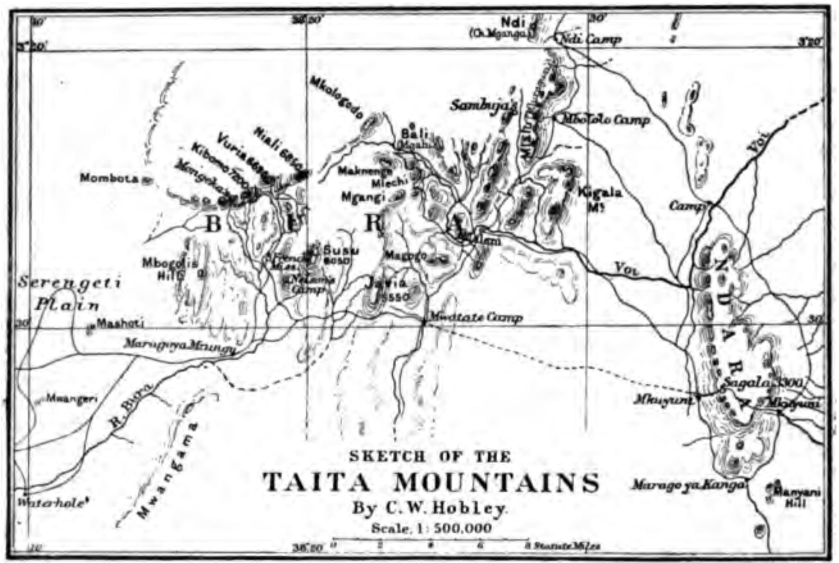
Away in the bush a few miles to the south of the river, opposite the Ngovi or Theuka mountain, a great irregular hump-like mass rises from the plain. This may possibly correspond with the gneiss dome called Manda; but here again the name is unrecognizable, the Wakamba calling the mountain Vaita. The Wakamba hunters told me that it is inhabited by a section of the Taveta tribe who cultivate the slopes. I was close under the northern slopes of the mountain, but could see no trace of the people, and the Wataita tell me that it was formerly inhabited, but is now deserted. The latter call it Ngolia. In connection with this, it may be mentioned that the people marked on the map as inhabiting this region, the Andei by name, as far as I know do not exist. The only people hunting over this country are Wakamba and Wataita, and neither of these people know anything of the Andei. Near the base of Theuka, on the right bank, there are large open stretches of alluvial ground covered with long water-grasses, and having signs of being periodically flooded, and on this account are highly adapted for the growth of rice; and the further one proceeded up river, the country became flatter, and these open stretches of alluvial soil occurred with greater frequency.

While we were in the neighbourhood of the Tsavo river, two curious phenomena were observed. On October 12, at about 10.30 a.m., a kind of parhelion was seen; it consisted of a luminous halo around the sun, the diameter being about 30° of arc, and between the halo and the horizon was part of another luminous inch, nearly touching the horizon, and running for about a quarter of a circle.

On October 20, at about 1 p.m., I experienced a slight earthquake, or rather earth-tremor. There was no perceptible motion, but it had a similar effect to the passing of an express train at a distance of a few yards. Its direction seemed to be from the west.

On the morning of the fifth day after leaving the station, our course was turned down the stream, there being just enough food eked out with game to enable us to reach the station.

Leaving the Tsavo valley, we turned our steps in the direction of Taita, and a camp formed at Mbololo, which is situated at the southern end of the great mass known as the Ndi mountains. Mbololo is a very pretty site for a camp, being situated at the base of a small amphitheatre in the mountain range. An abundance of running water is found close to the camp, and the tents can be pitched under the shade of some enormous sycamore fig trees. The food, however, being very scarce at this place, it was decided to move camp, and accordingly, on November 11, we marched south, through the pass between Mbololo and the mountain to the east, known as Kigala, descending into the valley below, where there is a running stream, which rises in the mountain on the west side of the Mbololo ridge, and eventually joins the Voi river. Proceeding parallel with the western spur of the mountain, which runs still further south, we eventually reached the valley of the Voi, and, crossing the stream, encamped under some fine specimens of the large thorny acacia on the south side. We were now in what is called the district of Mlaleni.



SKETCH OF THE
TAITA MOUNTAINS
By C. W. Hobley.
Scale, 1 : 500,000

George Philip & Son.

Soon after our arrival, the headman of the district sent down to inquire whether our intentions were peaceful or otherwise, as caravans seldom pass, and no European had been there before. The messengers retired reassured, and the headman, Mzee Mogodi, then sent in a goat. I responded with a present of cloth, and we eventually became very friendly, and he gave us greater assistance in the shape of food than any other headman in the Taita district. He made his people grind and bring in flour during our stay at Mlaleni, and a large amount of food was purchased, in the shape of maize, flour, plantains, and mbaazi (a small kind of pea).

As I was the first European who had visited the place, Mogodi was extremely anxious that I should make blood-brotherhood with him, and as he was about the most important headman in Taita, I deemed it judicious to accede to his proposal. The day fixed for the event having arrived, a large number of Wataita assembled to witness the ceremony. A goat was killed and hastily skinned, when a small piece of meat was cut from the region of the breast and broiled over the fire; a mat was spread on the ground, and we sat upon it, facing each other. When the piece of meat was ready and cooked, a small incision was made upon the chests of Mogodi and myself sufficient to cause a minute spot of blood to appear. The piece of meat was then divided, each piece being touched by one of the spots of blood; these pieces were then exchanged and eaten; then, after a final embrace, the ceremony was ended. At the conclusion, Mogodi made an impassioned speech to all the tribesmen, stating that, now this tie had been contracted, they were to look upon me in the light of one of their own headmen, and that at any future time, if any quarrel arose between us, it was to be looked upon as a matter for our two selves only to settle; and that even were I to kill him, this was to be considered no business of theirs, and that they were not to avenge it in any way. This was, I presume, intended to show what unbounded confidence he placed in any one with whom he had contracted this tie. At any rate, I must say that, in the light of subsequent events, so far as I had dealings with him, he never departed in the least from his profession of friendship; for I had occasion to leave in his charge a large amount of food, and on each of the bags I placed a very small private seal, and I may mention that on my return these were all found to be intact.

The valley of the Voi is here very distinctly marked, and the land is very fertile. There are wide strips of dark alluvial soil on either side of the stream. The ground is closely cultivated by the Wataita, Indian corn or maize being the principal product. Mbaazi, koonde, and sweet potatoes are also grown to a considerable extent, and there are large tracts along the river and below the hills planted with sugar-cane and plantains. Excellent butter can be obtained here, as the Wataita possess a goodly number of cattle, and enormous flocks of goats and sheep. The Taita ideas as regards cultivation are not very high; they promiscuously plant maize, millet, koonde, wimbi, etc., all in the same area—this, too, without cleaning the ground from the dead stems of the last crop; and yet, as a rule, they get magnificent crops—that is, if there is only a sufficiency of rain. Some 2 miles to the north-west of Mogodi's the Voi splits into two streams, the larger coming from the west and the smaller one from the north. The Voi at this season (November) is only a small stream, but in the rocky pools of its upper course large numbers of tiny fish are found, about the size of a sardine, and are called *dagarr* by the Swahilis. There is also a large fish which lives under the boulders in the stream-bed; it is rather like an eel, but stouter, and often attains a length of between 4 and 5 feet; it is called *mkunga*. In the rocky stream-beds of the smaller branches of the Voi the maidenhair fern is found growing in great luxuriance.

On November 15 we left Mlaleni, and after marching about two hours in a southerly direction, then turning to the south-west, in about half an hour we began to descend into the Mwatate valley, and another three-quarters of an hour brought us to the camp at Mwatate, on the Taveta road. The Mwatate valley varies from half a mile to a mile wide, and is very fertile in its lower portions; it contains large plantations of maize, sugar-cane, and plantains. The valley lies on the south-east side of the range of mountains, which ends so abruptly in the bold crag of Mwatate or Javia.

Some few miles to the north-east of Mwatate a colony of Wakamba have settled on the hills and cultivated a portion of the valley; they originally came from an isolated Wakamba settlement south of Kisigau, just within the German boundary. The hills in this part of the district, namely, at Mwatate and Bura, have a greater rainfall than those further north, as is shown by the greater amount of verdure visible upon their slopes and summits. The grass is perennially green, and the top of Mwatate mountain is partly covered with luxuriant growth of bracken fern. The Wataita show great ingenuity in conducting water through artificial channels among their plantations in the mountains, and, the little rivulets having a very rapid fall, they are enabled to do this without any great difficulty, and without the intervention of any mechanical water-lifting apparatus.

The Mwatate valley runs away southwards to join the Umba river, its course being marked by a belt of good timber; there is a fine fertile stretch of land at the bottom of the valley, capable of growing a large amount of grain. On November 18 we left Mwatate, and proceeding westward, climbing over the lofty spur which runs south from the crag of Javia, and winding round the flanks of the hills, a march of nearly 3 hours brought us into the Bura valley, where we encamped. Bura consists of one wide valley running nearly north and south, this valley ascending towards the north in a series of steps until the higher peaks are reached, the peaks being ranged round the head of the valley like a gigantic amphitheatre. From the bottom of the valley not a single village is visible; but if one climbs up to the higher parts, one is amazed at the number of villages dotted about in the nooks and corners of the slopes below him. The whole area of both hill and valley is extremely fertile, and in the hills, wherever there is a lack of moisture, the natives artfully construct small conduits to irrigate the spot requiring water, there being perennial streams in every valley. The portion of the valley below the lowest step is an area of surpassing fertility; it is covered by one extensive banana grove, with here and there a sycamore fig tree dotted about. The banana plants grow to a large size, attaining a height of 15 feet, and the parts of the valley in the direction of the plain are principally given up to the cultivation of maize. In the hills, sweet potatoes, manioc, koonde (a small bean), and sugar-cane are the principal products. Here was also noticed the *mayugwa* of Kikuyu; it is a variety of colocassia. From the point where the Bura plantations end to a distance of, say, 16 miles into the plain of Serengeti, the course of the dry sandy stream-bed proceeding from this valley is fringed on both sides by a belt of noble forest trees, many of large dimensions. Up to about 6 miles from Bura, water can be obtained in various spots by digging in this stream-bed; beyond that point the water seems to become quite absorbed, none being found unless after exceptional rainfall. It is rather undecided at present whether this stream-bed drains away to the river Rufu or to the river Umba.

During my visit to Bura, being desirous to see the great plains of Serengeti, and if possible to obtain a little meat as a change of diet for the men, I made a short trip in that direction. These plains were formerly famous for the enormous quantity of game which inhabited them; but now, thanks to numerous European sportsmen, and the efforts of Wachagga and Wataita hunters, such is no longer the case. Very little game was seen, the only thing of note being a magnificent herd of about twenty giraffes. For the first few miles beyond Bura there is a fair amount of bush, and occasional belts of cactus and aloe; but beyond that, the wide open rolling plains stretch out before you in the direction of Taveta and Lake Jipe without a break, and with hardly a tree or bush.

On this journey I took with me several Wataita guides, and amongst these a native of Chagga, who had been driven from Chagga for practising witchcraft, and come to live at Bura; but soon after his arrival suspicion was aroused that he was killing cattle by his art, and the Wataita decided to kill him, and would have done so, were it not for the interposition of the French *padré*, who took him under his protection. This man volunteered to accompany us in the hopes of obtaining some meat, and I took him with us on account of his local knowledge of the plains. In camp at night he said he would prophesy as to whether we should obtain any meat during our wanderings on the following day. He accordingly took some pebbles, put them into a calabash, and rattled them about, listening the while with an air of intense concentration. After a while he informed us that in the first place a beast unfit for food would be killed; secondly, a supply of food would be hit upon right away in the bush; and thirdly, some large animal would be killed. I thought no more of it at the time, but we started off before sunrise next morning, and after being out about an hour and a half, passed over some stony ground, and I suddenly saw the native in front leap high from the ground, and immediately ahead espied a large puff adder raising itself up and about to strike. Bringing my rifle to my shoulder, I at once blew off its head. This was incident number one. Going ahead for about a quarter of an hour, I suddenly came across a small *zereba* or *skerm* of thorns made by some hunters, and inside this we found a small pile of green bananas, beside the ashes of an old campfire. This was incident number two. About a couple of hours after this I managed to shoot a hartebeest; so, as it turned out, his forecast was right in every particular. At night he was again asked to find out what was to be the luck on the following day. He repeated his performance, but said that nothing would be killed; and although we had a long day, and every effort made to obtain some meat, the game was so wild and kept in the open, that we never found it possible to get within range; so the result of his prophecy, although a negative one, again came correct. I give this simply as an example of native attempts of prognostication of events. Whether the fulfilment was anything more than a coincidence I cannot pretend to say; one can always explain these sort of things by talking of coincidence. I have, however, given the facts as they occurred.

The chief headman of the Bura valley is an individual called Mbogoli, a man of considerable influence in this district, with a large number of villages under his control. He and his people are very friendly to passing caravans, and food, although dear, can be obtained without much difficulty. Of an entirely different caste are the people in the western flank of the big peak Vuria; these are the people of the late chief Mongeka, who was killed in the punitive operations undertaken by the Company in May, 1892. They are a tribe of marauders, and even now, after the severe lesson they then received, they will follow and lurk round the camps of small Swahili caravans to steal their trade-goods by night. The rest of the Wataita seem to have very little sympathy with them; even their language is a more archaic form than that of the other districts, and there is reason to believe that at some time or other this section of the Wataita received a considerable infusion of Wachagga blood. Large numbers carry spears, which is not the Taita custom; others, again, wear the characteristic Chagga circular ornaments, distending the lobes of the ear. There is, moreover, a large iron-working industry among this branch; they are the only Wataita who work iron, and they supply the whole country-side with axes, hoes, and knives. This ability, as is well known, is a great characteristic of the Wachagga, and the idea of irrigating their plantations among the hills by means of lateral water-channels is in all probability imported from Chagga.

Some six or seven years back there was a great drought, and consequent famine at Taita; large numbers of the inhabitants died off, others moved temporarily to Taveta, Ukambani, and numbers of the children were sold into slavery to buy food. This period, which is known as the *Mokusenga*, and other similar periods in the more distant past, seem to have crippled the Wataita beyond their power of recuperation. Before the occurrence of these blows to their prosperity, large areas of ground at the base of various mountains—Ndi, Mbololo, Ndara, Kisigau, etc.—were under complete cultivation; but the people have been so reduced in numbers that only about one-fifth to one-sixth of the former areas is at present under cultivation, the remainder having lapsed into tracks covered with grass, and here and there dotted with light scrub, the most extensive of these tracks being at Ndara. Before this time of drought, the mountain of Maungu was even inhabited; but, the water-supply failing for so long a period, they were obliged to abandon it and retire to Ndara.

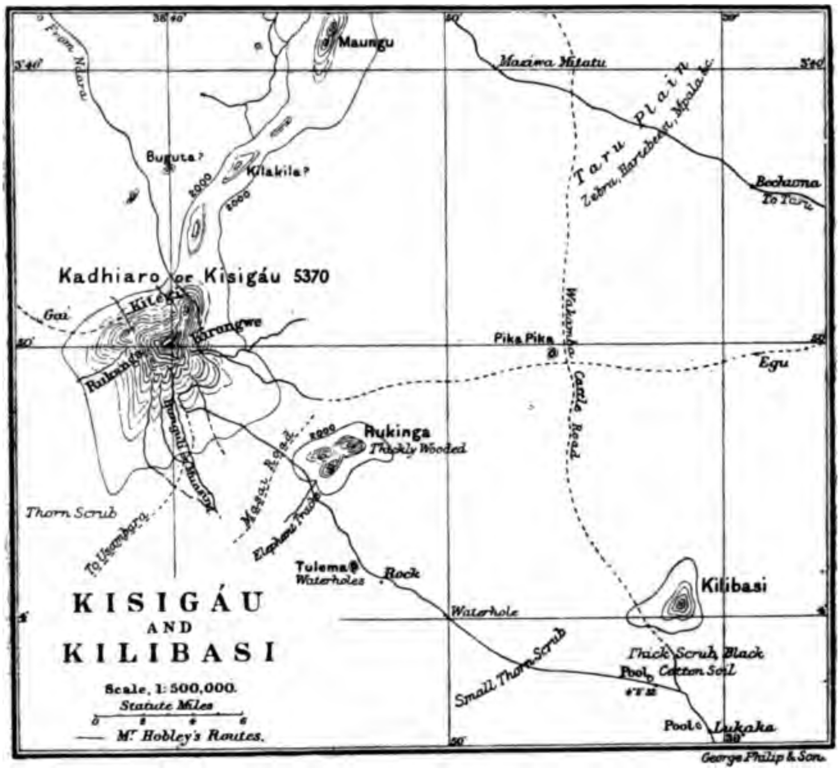
The question of the immediate development of this district is one, I think, that is worthy of some attention; the construction of the road, which is now nearly finished, will place Taita in close communication with the coast by means of wheeled vehicles, thus enabling products to be profitably exported to the coast markets; and it would be well for the administration to encourage the Wataita to reclaim the large areas formerly occupied by their plantations which have now lapsed into waste land. If the Wataita were found too few in number (which is probably the case) to cope with the work, native colonists could be introduced, preferably Indians. A colony of this description would do a large business with passing caravans alone, as all travellers would have to obtain food here to carry them on to Ukambani; moreover, if the railway be constructed, the presence of a food dêpot of this kind would be of great assistance to the work. The localities available for the cultivation of rice are limited to the Voi valley—there is a considerable swampy track at the north end of Ndara eminently suitable for this product; but dhurra, or millet, maize, beans, manioc, sweet potatoes, plantains, and sugar-cane can be extensively grown. The Mlaleni district is eminently adapted for cattle; the Wataita told me that during the last visitation of the disease it nearly entirely escaped the scourge. Between Mlaleni and Ndara are large stretches of good grazing land.

On November 30 we left Mlaleni, and proceeded along the valley of the Voi towards Ndara; the road for about two miles actually follows the river-bed of the Voi, and on this occasion it necessitated marching knee-deep in water. About four and a half hours' journey brought us to the camp of Mkuyuni, just below the sight of the abandoned mission station of Sagala. There occur in the Voi valley vast beds of beautiful white crystalline limestone, interfoliated with the metamorphic schists, and these same beds, by means of great faulting in the Bura mountains, are again repeated on Serengeti plain, and also near Mwatate. The western face of Ndara is entirely uncultivated, and covered with dense bush, but the summit is extensively cultivated, and is extremely fertile; it is intersected by a wide valley running north and south, abounding in rivulets of water. There are two camps at Ndara, known by the name of Mkuyuni, one in the east and the other on the west. The name of Mkuyuni is derived from *Mkuyu*, a sycamore fig tree, and the suffix *-uni* is simply one of location, meaning " at," both of the camps being shaded by fine specimens of this tree.

At the time of my visit the Wataita of the villages on the eastern face were suffering from the ravages of a disease, whether epidemic or otherwise I know not. The symptoms were swellings of the glands in the groin and armpits, pains in the head and abdomen, accompanied by diarrhœa. Death usually occurred at the close of the second day or on the morning of the third day after seizure; few of those attacked recovered from it, and, as far as I could gather, a considerable percentage of the population on the east side of the mountain had succumbed within a few weeks; they seemed quite paralyzed by the fear of it, all cultivation, etc., being at a standstill. The symptoms seemed to be identical with those of the Uganda plague.

On account of this sickness, which might have been contracted by the men, I decided to move from here as soon as practicable, and on December 6 the camp was struck, and a start was made for Kisigau. We first proceeded to the Swahili camp to the south of Ndara, known as Marago ya Kanga (camp of the guinea-fowl); near here a narrow track leaves the main road and runs away south to Kisigau. A march of about 21 miles from the south end of Ndara brings you to Kisigau. The last hour's march before reaching the mountains is through a most dense jungle of cactus, spiky aloe, and wait-a-bit thorn trees. The camping ground is most picturesquely situated at the foot of the mountain, the outline of which, with its tabular top, is extremely striking, and the great boulders of rock, which have in times past been broken from the upper face by atmospheric agencies and have rolled down the slope, stand out pink and grey among the banana groves, and form a most pleasing picture. After a short stay at the camp on the north-east face, we marched round the base of the mountain to the south. Progress was very difficult; the ground was fairly open, but every few yards it was intersected by deep nullahs, or torrent-beds, some as much as 20 feet deep, and these had to be crossed. But at last a native path was struck. Following this, we soon arrived at the camp on the south side, which is generally known as Marago ya Mnazi (camp of the coconut tree), so called from a solitary coco tree standing on the slope above the camp. Formerly a whole grove of coconut trees existed, following the course of the stream which runs down the mountain, but in the famine year they were foolishly cut down that the owners might eat the soft, tender, undeveloped shoots at the crown of the tree. The camp is very completely shaded by a fine grove of trees with beautifully silver bark; they are known as *Msassi*. They have a very rough leaf, which can upon occasion be used as sandpaper.

The Kisigau people in many ways appear to be more enterprising than the other Wataita. They have, for instance, introduced from the coast, limes, coconuts, papaws, pine-apples, and one or two other products, which as yet are quite unique among these tribes. All the importations seem to flourish.



KISIGÁU AND KILIBASI

Scale, 1:500,000.

The people on the south side of the mountain seem to live in considerable fear of the Masai raiders, who occasionally pass on their way from Arusha, Useri, etc., and camp here for the sake of the water; on this account the inhabitants of the mountain are afraid to open up for cultivation the plains around the base. As long as they confine their operations to the steep slopes they are safe, for the Masai will not venture upon the intricacies of the mountain-paths. There is a considerable amount of game in the plains south of Kisigau, and the rare antelopes, the greater koodoo and sable, may be occasionally seen; the elephant and buffalo are also present. High up on Kisigau, at an altitude of about 3000 feet above sea-level, several specimens of the fresh-water crabs (*thelphusæ*) were observed.

On December 12 we left Kisigau, and struck coastwards by the Wanga route. Generally speaking, the road bore south-east by east. A march of about 7½ miles brought us to the south end of Rukinga, a mountain mass running north and south, and rising abruptly out of the plain east of Kisigau. It is uninhabited, and its slopes are clothed with thick woods. After passing Rukinga the bush is very thick, and the path becomes very obscure; for this road, although the most direct, is now unused by the Wataita, as they pass by way of Pika-Pika and Kilibasi. A few miles beyond Rukinga we arrived at the Ngurunga, or rock-pools of Tulema. Upon reaching a point opposite Kilibasi, a halt of one day was made to explore in the direction of that mountain. Proceeding towards the mountain, the aspect of the country entirely changes; new species of trees make their appearance, in many places massed together in dense forests; the bright red sand gives place to a black cotton soil, and there are evidences of the presence of large swampy patches in periods of heavy rainfall. Upon seeking the reason, we find that we have now reached the boundary of the metamorphic rocks of the interior, and have entered the area occupied by the sedimentary deposits, which are most characteristically seen in the neighbourhood of Taro, which may be conveniently referred to as the Taro sandstones. The boundary passes a little to the west of Kilibasi. That mountain, protruding through the sandstones, stands isolated as the most eastern representative of the metamorphic series. To the south of the mountain, in its immediate vicinity, the large trees disappear, and the ground is covered by dense bush, about 8 or 10 feet high; the mountain itself is clothed with thick forest.

The Wakamba cattle-road to Wanga skirts the western flank of Kilibasi and joins the direct road from Kisigau, and henceforward the road coastward is much improved. About 3 miles from this junction is the camp of Lukaka, one of the regular camping-places at which water can be relied upon; there are here large and numerous water-holes in the Taro sandstones. Another 6¼ miles brought us to Birikani, which is also a regular camping-place; and here, on the summit of an isolated mass of rock, are some very peculiar water-holes. The orifices are about 6 inches in diameter, but within the rock they are chambered out to a diameter of several feet, and the surface for evaporation being so small, they are hardly ever known to dry up. The rock is composed of Taro sandstone, which seems to be naturally adapted for the formation of these water-holes. There is, however, not the slightest doubt that their formation is entirely due to natural causes, to the weathering action of the air and the organic action of plant-life.

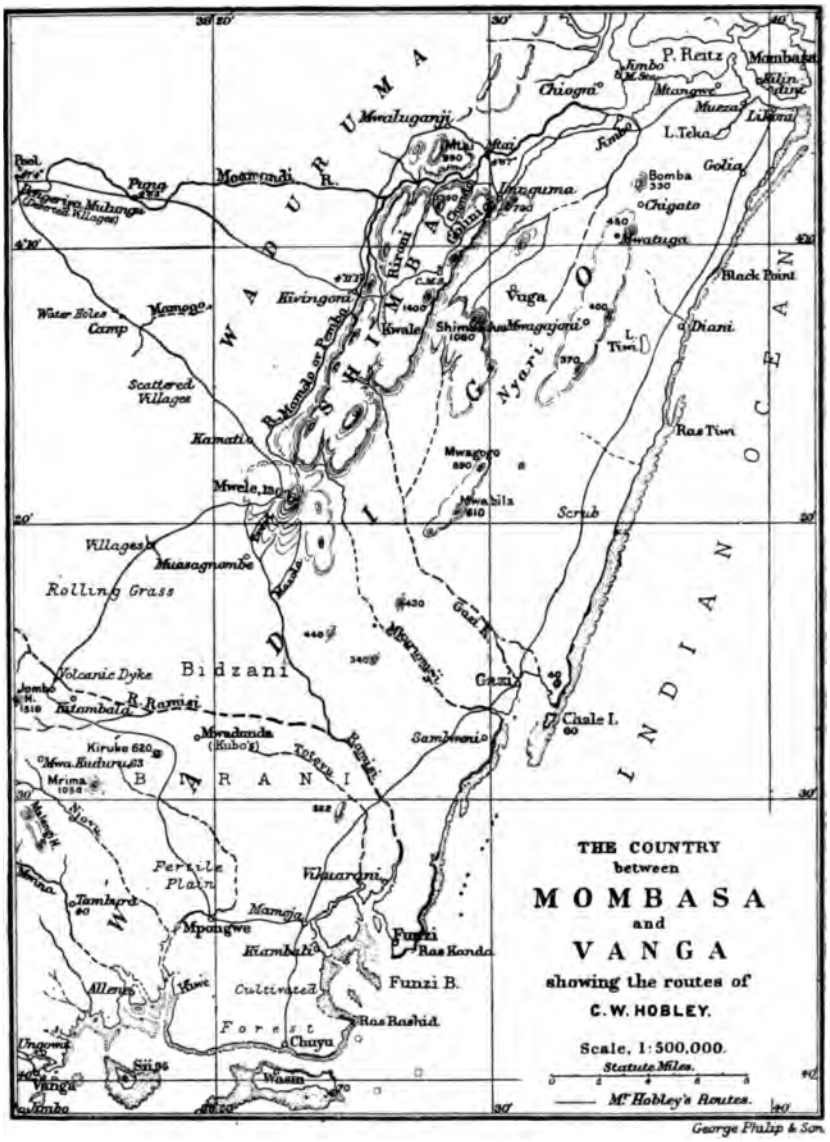
The whole of this district is the hunting ground of the Walangulo tribe, who live in the vicinity of Taro. These people are, like the Waboni, hereditary slaves of the Wagalla, and they are supposed to hand over to the Gallas half the ivory they kill; they formerly lived in the jungle around Taro, but have now moved to near Samburu, where they are intermixing a good deal with the Wanyika, and thus evading the authorities of the Gallas. The Walangulo are marvellously keen hunters and clever trackers. The Wanyika told me that the Walangulo prepare a drug from certain plants which enables them to track game by means of scent. This drug being swallowed by the hunter, renders his smell so acute that it enables him to follow up the game in the same way as the hound; in fact, I was even shown two plants said to be ingredients of this mixture. Of course, this idea may be accepted for what it is worth. It may have arisen from people having seen those hunters following up tracks which were to the ordinary native quite invisible. In appearance they are very similar to Wanyika, but they carry very long powerful bows. Parties of these hunters are often hired out by the chiefs of Chagga to hunt elephants; their method of dealing with thick-skinned animals, like the elephant and rhino, is to shoot them with a poisoned arrow in the comparative thin skin at the back of the foot just above the heel.

In the bush to the south of Kilibasi a considerable number of the lesser koodoo (*Strepsiceros imberbis*) are to be found, but between Kilibasi and Kisigau very little game is to be seen, a few giraffes, mpala, and hartebeest. Some little distance to the north of this road a curious sight was seen—namely, that of a pack of wild hunting dogs engaged in pursuing a solitary zebra; the zebra was flecked with foam, and evidently, being very hard pressed, could not possibly hold out much longer from its bloodthirsty pursuers.

Leaving Birikani, we marched on another 4 miles, and camped in a small valley with abundant water-holes. However, before reaching camp we passed through a very desolate-looking stretch, too stony to grow much vegetation. On the 16th a short march of about 5 miles brought us to Ada, and we camped here with the idea of purchasing food, but to our surprise found the Wadigo villages one and all deserted, at some comparative distant period. I afterwards found that all the inhabitants had moved coastwards soon after the year of the big famine. This discovery was rather serious, as the caravan was short of food, but later in the day I was fortunate enough to obtain some game to supply the deficiency. The country to the north of Ada is of a very desolate, stony character, and also seems to suffer from a chronic state of drought; even the trees are all dead and shrivelled from want of moisture, and grass there is absolutely none. However, from later observations I find this barren belt is not of very great extent. On the 18th, after about 8 miles' march, we entered the Digo country proper, and thenceforward to the coast is one inhabited stretch. The country is vastly greener and more fertile than any passed through from Kisigau, and there is, moreover, an abundance of water in most of the villages. After a march of about 16 miles we camped to the north-west of the hills of Jombo. Passing to the south of this hill on the following day, we reached the river Mwena. Leaving the river Mwena, about 6½ miles' march brought us to the river Umba, and the coconut plantations which follow its course. The point at which the Kisigau road reaches the Umba is marked by a village called Gonja. Proceeding onwards about south-east, a continuous series of fine plantations of coconut and mango trees are passed through, and there is a thick population of Wadigo. About 9 miles from Gonja we entered the town of Wanga, and camped in a large coconut grove outside the walls belonging to Sheikh Mbaruk. Immediately behind Wanga is a large extent of very low-lying flat land, the soil of which is black alluvial mud; this area can be periodically flooded, and is extensively employed for the purpose of rice cultivation. The whole tract is divided up like the squares on a chessboard by means of earthen embankments or causeways, which partition up the area into a series of shallow tanks. The water is first let into these squares nearest the river, and by means of primitive sluices it is taken on to the adjoining plots at the will of the cultivator. On account of this large swampy area near the town, and the abundance of mangrove on the sea-front, the town of Wanga is distinctly unhealthy and malarious.

Leaving Wanga on the following day, we proceeded by boat to Chuyu on the mainland, opposite the island of Wassein. The Company have here built a substantial residence for the agent of the district; it is a very pleasant site, and is a much healthier situation than either Wanga or Wassein. There are here found numbers of large caves in the coral rocks, the rock having been dissolved out by the action of the sea-water. At the back of the house, some miles in either direction, there is a belt of dense forest containing excellent timber; moreover, the creeks all along this stretch of coast are lined with thick fringes of mangrove; this mangrove timber often attains large dimensions, many of the spars being from 60 to 70 feet, perfectly straight, and having a diameter of 2 feet at a man's height from the ground. Even now the timber trade of the district is considerable, a large amount being sent to Zanzibar; but the quantity is so great, and so admirably situated in close proximity to the seashore, that it cannot be long before European enterprise will establish steam timber-mills in this locality.

Leaving Chuyu, we returned to Mombasa by the route following the coast-line; *en route* the town of Gazi, the residence of the great chief Mbaruk-bin Raschid, was passed through, and the old sheikh visited. This man is a very striking character, and is the head of the Mazrui faction on the coast, and he claims to be King of Mombasa, the Mazruis having held independent possession of that town until driven out by the Sultan of Zanzibar. Mbaruk's power was, however, greatly broken by Said Burghash, who sent an army under General Mathews to bring him to terms. Mbaruk fled to his fortified stronghold Mwele,



THE COUNTRY
between
MOMBASA
and
VANGA
showing the routes of
C. W. HOBLEY.
Scale, 1:500,000.
Statute Miles.

George Philip & Son.

at the south end of the Shimba hills, and was there besieged by General Mathews' forces; but after a few weeks the place was taken by assault. This place, Mwele, is situated on the summit of a hill, 1400 feet above sea-level. The hill is crowned by a fine patch of forest; from without not a trace of habitation can be seen, but upon approach an arched tunnel is noticed. Following this footpath for about 200 yards, one arrives at a strong timbered gateway, and passing under this emerges suddenly into the town, which is built entirely in an open space cleared in the centre of the forest. The forest is very dense, and impassable on all sides—so dense that no stockade is needed. The open space is approximately circular, and about 250 yards in diameter; there are two entrances—one from the east and the other from the west. The houses are built wholly of wattle and daub, but they are all clean and tidy, and the whole town is kept exemplarily clean, every householder having stringent orders as to sweeping, etc. There are numerous traces still visible of the fighting between the Sultan and Mbaruk, in old rifle-pits, earthworks, etc. The forest around the town abounds with various species of monkeys, amongst which is the rare *Colobus Kirkii*, which was thought to be extinct when exterminated in Zanzibar Island.

Mbaruk belongs to the great chiefs of the coast, among whom might be placed Bushiri, Hamis Kombo, Suliman bin Abdullah, and Fumo Bakari. These men were the last representatives of a great race of warlike Arabs, who wrested the whole coast, from Magodisho down to Mozambique, from the hands of the Portuguese. In a few years they will be extinct; for these men, being brought up in troublous times, pushed themselves to the front by the sheer force of their personal abilities. But their sons have not undergone any such severe training; they are now living a life of laziness and apathy, and are effete and degenerate representatives of their race. In many ways this is to be deplored, but it will probably render the administration of the country an easier task, for the younger generation will not be able to raise much opposition to the innovations attendant upon European modes of government. Leaving Gazi, about a day and a half's journey brought us to Mombasa on December 24, 1892, after a trip of 95 days' absence.

There are a few points relating to the physical features of the coastlands in the southern parts of the territory that I should like to note. In the neighbourhood of Mombasa, starting inland from the sea, we first get what may be termed coral beds, which are the remains of enormous fringing reefs now raised above sea-level. The soil on the surface of this coral is an indefinitely small quantity near the sea, the country being simply a mass of jagged coral spikes; however, notwithstanding the paucity of the soil, vegetation seems to flourish in the rich calcareous humus lying in the interstices of the coral. This belt of rugged land varies from ½ to 1½ mile in width; after that the soil deepens, and the area is covered by a continuous belt of coconut shambas, the width of this belt varying from 2 to 3 miles. This area was formerly occupied by the lagoon which may be seen to-day within the reefs of the coast. Beyond this there is a very sudden change from shambas into grass lands of a very arid, stony character, and thus marking the line of junction between recent coral formation and the older ferruginous shales and mudstones of about Jurassic age. These shales being much jointed and broken are easily denuded, and during the periods of the tropical downpour of rain, the area in which these beds crop out is dissected and carved out into numberless steep ravines, and the bulk of the soil is completely washed away, the ground being covered with a mass of shale and *débris*. This belt possesses no good timber, but is characterized by specimens of a stunted variety of ebony and other hard-wood trees of small dimensions. Beyond this comes the massive sandstones, probably of newer Palæozoic age, which compose the prominent ranges of Shimba, Buni, and Ribe. Slight variations are sometimes caused by the occurrence of a bed of white alluvial sand, which covers the arid shales often to a depth of 20 feet. Where this occurs, as at Changamwe, the plantations run inland nearly to the limit of this belt; but usually between the plantations and the open barren lands there is a tract of forest, and this tract carries some very useful timber: *msandarusi* or copal, *bamba kofi* or red copal, *mriti* or African ash, *mwalika*, *mchaani*, *mkwaju*, or tamarind, *mkomo* or hyphæne palm, *mzembarao* (which bears an edible plum-like fruit), and many other species specially adapted for all kinds of carpentry.

Now, at the southern end of the Company's boundary, this sequence is varied a little; the belt of rugged coral on the immediate coast-line is practically similar, but for some reason, perhaps a greater rainfall, it is usually covered by a magnificent belt of wood, from which a large quantity of valuable timber can be obtained. Proceeding further inland, the coral is at length lost sight of, but instead of the secondary shales dropping out as in the north, the deep white sand previously referred to covers everything, and there are large flat stretches of savannah-like country with timbered patches and belts at intervals. This type of country is varied by the presence of volcanic rocks, which stand out in the three summits, Jombo, Mrima, and Kiruko. The lower slopes of these hills are very fertile, and, in the case of the two latter, are extensively cultivated by the Wadigo. The flat stretches of savannah country give place to a gently rolling country, in which the older beds crop out, but the coarse sandstones of Shimba are entirely missing, their southernmost exposure being at Mwele. But throughout the whole width of the coast-belt, the barren secondary shales and mudstones never crop out to the same extent as they do between Changamwe and Mazera, and from this reason the width of the belt of very fertile country is several miles wider to the south than it is in the region of Mombasa. It may be here remarked that the volcanic intrusions of Jombo, etc., are of a later date than the shales and sandstones of the Taro and Shimba group, for in many places dykes, evidently contemporaneous with these centres of disturbance, may be seen intersecting and traversing these rocks.

NOTES OF A JOURNEY IN NORTHERN MONGOLIA IN 1893.

By A. A. BORRADAILE, late Bombay Civil Service.

THE mule-litter journey from Peking to Kalgan needs no description, and the crossing of the Gobi is almost as commonplace. With the kind help of M. Volasatoff, a Russian at Kalgan, and with two dictionaries, a contract was entered into by a Mongol to deliver me at Urga in twenty days, and on the evening of the 20th I arrived there. From start to near the finish I only saw six trees—stunted willows in a dry watercourse. There were immense herds of ponies, camels, and cattle, and flocks of sheep, and we passed long strings of camels going south with hides and timber, or north with tea. After a fortnight, when rather bored with the grand monotony of the landscape and its more than Trappist silence, my Chinese servant Liu San came running to me with the news, pointing to a camp, "One Loos woman, two piece Loos man, master." It did not take me long to pour the last drop of our precious water into a basin, make some change of dress, and pay a visit. Never did words sound sweeter than the "Entrez, monsieur" from the tent, where I found the most charming of ladies *en route* for Urga, under the care of a priest and a Cossack, all Roos.

The hills reached just before crossing the Tola are like all in Mongolia, bare on the south, but covered with forest on the north. Beyond the river are the two towns of Urga—locally Takuren—the Chinese to the east, the Mongol to the west, about four miles apart, with the Russian consulate midway on a commanding site. M. Shishmaroff, the consul-general, has a secretary and a dragoman, who occupy apartments in the main building. In the compound are bungalows for the postmaster and the chaplain, the green cupola of whose chapel, with its great gilt cross, forms a fine landmark. Some half-dozen student interpreters have a separate building, and about as many Cossacks form a nominal guard, the whole enclosed in a wall. Nothing could exceed the friendliness of every member of this little society, and I cannot help noting that it would be difficult to find elsewhere more beauty in such a small circle of ladies. At meals they occupied one end of the table, we men the other. The hostess received our adieux at the door, a pretty custom gracefully carried out.

With thoughtful consideration, M. Shishmaroff, whose acquaintance I had made at Tientsin, had secured me rooms with a Russian trader in the Mongol town, and I had only the first day to receive my letters and pass on. On a later visit his dragoman asked me, in a friendly confidential manner, for my real reason for the journey, and affected entire acquiescence in the reply, "Pour nous autres Anglais, Monsieur, il faut circuler." My host, M. Kazatchihin, was hospitality itself; he made for me another contract as far as Uliassutae, and at parting pressed on me everything he could think of useful or agreeable.

On Wednesday, May 17, I left Urga at 8 a.m. My cart drawn by a camel led by a Mongol on another, one more Mongol similarly mounted, several baggage camels in the rear, a Chinese interpreter and Liu San on ponies, composed the caravan. The contract was to land me at Uliassutae in twenty-five days for £60, and after starting I promised the men each a tael for every day gained; they gained five days. My cart, though springless, had been made comfortable by a 2-feet straw mattress, over which a Wolseley valise was spread; it had two side doors and a front window, and held my necessary belongings, books, etc. We generally stopped in the forenoon for a couple of hours, at 9 p.m. for half an hour, and then went on most of the night. The followers had a tent. A dog attached himself to us from the start, and saw us through.*

VIEW IN THE GOBI DESERT.

Our course lay west over a plain north of and parallel to the Tola till, about 3 p.m., the river made a bend to the south-west, and we mounted a low pass on to another plain between two ranges of grassy downs, which continued through the next day. I walked most of the way,† the weather perfect, climate glorious. On the 19th, at 8 a.m., we came to a small lake pronounced "Ha-ha," with quite a population with herds and flocks; to the south-west, beyond a nearer range, were seen the snow-covered tops of the Khangai chain. At 12.30 we struck the Tola, now some 100 yards wide and 3 feet deep, 90 miles from Urga. After crossing it we mounted by an easy pass into the hills, among which we wound till at 6 p.m. we came to a descent so steep we had to let the cart down by ropes. After another day of lovely mountain views, at 6 p.m. we sighted Chintologoi (Paderin's seventh station, *vide* Yule's paper, *Geographical Magazine* for July, 1874) far ahead on the main road, from which we here turned off to the south-west, 120 miles from Urga.

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* These dogs are the undertakers of Mongolia. There is neither sepulture nor cremation. When a body has pressed the button of departure he is carried to the outskirts, and then they "do all the rest." Whether our friend found business slack at home, or scented "a special line" with us, he only knows.

† My followers were greatly puzzled over my age. When they could bear it no longer, they formed a deputation to settle the point. "Mongols say master very old," began Liu San; and I bowed assent. "This man say, 'Look, see white beard;' that man say, 'The Daren walks 60, 100 li every day;' please, master, how old?" I opened my

There was much traffic, though less than on the Gobi. It consisted of ox-waggons laden with hides; families on the move, the smallest members perched in a sort of hen-coop above the baggage on the camels; men and women leading strings of ponies, riding alike, and equally at home, the pace a sharp trot without rising in the stirrups, seat easy and strong. Every one was pleasant and friendly; both sexes well grown. On the 21st Chintologoi was in full view to the north, the ridge on which the fort stands rising solitary out of a grassy plain with water and herds of cattle and camels. The midday halt was at a singularly beautiful site, looking across to the town of Pattangkor on the south slope of a hill. Four miles further we crossed a strong muddy stream 12 feet broad and 2 feet deep, running north, and then we turned more to the south along the foot of a rocky snow-covered range, which we skirted for some hours. On the 22nd I made a *détour* to a temple picturesquely situated in a semicircle of hills, with willows along the dry bed of a watercourse; it contained a large image of Buddha, with the usual quaint altar ornaments. Returning to the track, we crossed a wide plain intersected with many shallow streams, and about 6 p.m. crossed a wider and stronger one, which may be the Karukha. On the 23rd, after innumerable delays from baggage shifting, my cart-camel lying down, etc., we camped beside the Koshung-Orkhon, running north-west clear and rapid, an enormous herd of ponies disporting themselves in it. Here we left the track and took a bee-line to the west, getting gradually into broken marshy ground, which compelled a halt after dark.

The first thing I saw in the morning of the 24th was the fort of Kara Balghassun in the distance. Starting at 5 a.m., we did not arrive till 8·30; track there was none, the surface, covered with mounds of tussocky grass surrounded by water, could only be traversed by stepping from one mound to another. The Orkhon—a different stream from

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hands, and they counted ten; again, twenty; when we reached the forties, a look of "We are coming to it now;" the seventies brought gravity, which deepened at the eighties and with the century they solemnly stroked their beards and left that interesting survival.

yesterday's—some 50 to 100 yards wide, ran through the marsh with a north course. The fort is south of the Ugei Nor, and is a square about 400 yards each side, mud walls some 20 feet high. There is an opening on the east, and inside the west is a mound some 40 feet high; no remains of masonry. At the south-east corner another mound, as of a keep. Beyond the walls lines indicating the suburbs, and a fosse is at the foot.

The ruins were visited by the expeditions of Heikel in 1890 and of Radloff in the following year, and the resulting opinion is that the fort of Kara Balghassun represents the site of the capital of the Uigurs, and the monastery of Erdeni Tsao, some five hours to the south, that of Karakorum, the capital of Genghis Khan, who reigned there two hundred years after the former had been destroyed, and whose great-grandson Kublai, in A.D. 1253, there received Rubriquis, and in 1280 Marco Polo, and then moved to Cambaluc—now Peking. After all trace of its very site had been lost, Karakorum was in 1824 correctly placed by M. Abel Rémasat at the headwaters of the Orkhon. In 1872 Mr. Ney Elias tried hard to reach it, and at last, in 1873, it and Kara Balghassun were visited by the Russian Paderin.

INSIDE FORT, KOBDO.

The Uigurs originally occupied the northern parts of the Chinese provinces of Kansou and Shansi, but were driven out about the third century B.C., and settled west of Ordos. In A.D. 338 they established themselves on the Upper Selenga. In 629 they fell under Chinese domination, and to it, with few exceptions, remained faithful, their chiefs receiving princesses from the Imperial family, and from the Emperor a gold seal of office in the form of a fish. Lines of hostels were settled along the route by which the tribute of sable skins was annually conveyed to Peking, and everything done to maintain close friendly relations.

In 742 their capital was on the Orkhon, doubtless on the site of Kara Balghassun. They must then have been of some importance, for they defeated a certain rebel, with a loss to him of 60,000 killed and 20,000 prisoners, and with the reward of one of the Emperor's own daughters and a long title to their chief. They then helped to drive the Tibetans from China, but overstayed their welcome and committed so many outrages in Peking, that when, on a subsequent need, they offered assistance it was declined as too dear. A deputation to solicit the hand of a princess in 821 consisted of 2000 women, 20,000 horsemen, and 1400 camels.

Their fall was sudden. In 745 their sway had extended to the Altai, and generally corresponded to the old empire of the Huns, with whose language their own had affinity; but in 839 famine and pestilence, with snowstorms which destroyed their main wealth of cattle, sheep, etc., ruined them; and the next year, attacked by 100,000 horsemen, they were completely wiped out, their chief killed, and capital burnt. By command of the Emperor of China, monuments with sculptured inscriptions were raised, and these have been the object of the learned pilgrimages alluded to.

Some 300 yards outside the south front of the fort one lies in fragments, and from these Heikel has prepared a sketch of what it may have been in the ninth century, of red marble, with a height of 600 c. m. and a base width of 200. The body is covered with trilingual inscriptions, of which the Chinese alone is in known characters; those of the others correspond in some degree to those found in the Yenisei valley.

The ruins and their desolate surroundings did not invite a long stay, and a visit to Erdeni Tsao did not promise anything of greater interest. There was no visible population, but Liu San, the last thing at night, emptied his revolver for the information of visitors.

On the 25th we left Kara Balghassun, and, holding the same west course, passed into higher ground with green downs, and so among the hills, till at 10 a.m. next day we struck the south Tamir, a strong clear stream some 40 yards wide and 3 feet deep, with a north-east course, and from the crossing followed a south-west line parallel to it up the valley. Willows in plenty were along its banks, and these and the few seen on the 22nd were the only trees since leaving Urga. At 6 p.m. passed the Lamaserai of Tsai ya Kake, beautifully situated on the high left bank, and an hour later the town of Tsahang da va naigur, at the foot of hills sheltering it on the west, north, and east. Here, as night fell, I got separated from the caravan, and passed a rather bad quarter-hour. Every one had gone to bed except the dogs ; I could not have asked the route, and had every belief that the people would, as often before, go on for hours, thinking they were following me. However, some one was sent back, and found me chilled to the bone, but hot soup and some medical comfort[*] brought me round.

HIGH STREET, KOBDO.

The following morning (27th) saw us camped beside a mountain tarn, frozen 2 feet thick, and surrounded by a forest of pines, a most picturesque spot. The pass we had now to tackle was too much for the camels, which were replaced by bullocks. How even they got the cart to the top I cannot conceive, for I went ahead in despair, and the descent on its north side was almost as bad. It was pleasant to hear the cuckoo, which put me in touch with home. About noon we struck the north Tamir, and passed up its valley on the right bank till the next day, at 9.30 a.m., when we crossed to its left bank, and a few miles later left it altogether and took a north-west course, gradually mounting by a gradient easy till near the head of the pass Ulaldza, when ponies had to replace the camel. During the night we crossed the Khanui and had come to the Chilutu, but, to avoid a bad crossing, turned to the north, and, skirting its right bank for some hours, then crossed a fine clear stream, strong, with a rocky bottom. We then resumed the west course up a valley, through which ran a torrent forming a chain of lakes, each frozen thick; the green foaming water, the blue ice, and the snow above it formed a charming sight. We then again struck the Chinese post route, and engaged a yak and bullock for the morrow.

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[*] ℞ Spiritus frumenti ... ... ℥ ii.
Sacch. alb. ... ... *q.s.*
Aq. bullient ... ... O ss.
M. fl. haustus.
C.K.

They were much wanted, for the track was bad up the pass, the head of which forms the watershed between the rivers of the Siberian system and the Jungarian to the south. We descended more easily, and camped by the Khurmingol. The next day (31st) crossed this, and over delightful rolling plains reached the Zak, and at 5 p.m. on June 1 struck the Sarasnagol, where, its three branches having united, it bends to the west. The splendid plains were covered with camels, ponies, and sheep, but the population sparse. Crossing the Sarasna where it bends to the south-west, and continuing along its left bank till 5.30 p.m. of the 2nd, we then crossed to its right bank and left it on our west course. All the higher hills were now (3rd) covered with snow, the population greater, and wildfowl, geese, Brahminy duck abundant. There were many circular grave enclosures, showing a former large and wealthy population. A stream we followed all day seemed to be the Buyanta.

At starting on the 4th the road became worse than ever, stones, fallen from the steep hillsides, covered all the narrow track like a London road under repair, and made it equally painful to walk or to ride. The redeeming feature was the broad ribbon of colour on both banks of the stream made by iris of all shades of purple, the clumps, 2 and 3 feet diameter, continuous for miles. Population increased; there were plenty of sheep, guarded by men on ponies without dogs. Snow fell off and on all the 5th, with a gale of wind. We passed a Lamaserai with the sacred legend, "Om mani padme Hom," in white stones set in the turf of a hill opposite, and then began to ascend the last pass; it was very steep, and made worse by the wind in our teeth. But the view from the Kotul repaid me. A sea of mountains all around, and nestling at our feet some 10 or 12 miles to the west lay Uliassutae. It seemed the highest point reached, and I would gladly have lingered, but a blizzard was blowing, and we descended by sharp zigzags into the valley, and were soon receiving a friendly welcome from the Russian colony.

The Yamen is in a walled enclosure a mile from the town, and reserved exclusively for the Chinese officials and garrison. There I went on the 6th, and was politely met and asked why I had not been heard of before, as, under orders from Peking, I had been awaited along the whole line. I replied that I had no wish to trouble the Administration while I could manage by private contract, but was now forced to beg their good offices. This seemed to please them, and they at once gave me a posting order to the frontier, *viá* Kobdo. Along the route are stations every 15 to 20 miles; each has a Chinese and a Mongol white button, whose duty it is to receive the traveller, place a clean felt tent at his disposal, and provide relays of animals.

We left on the 9th; on the 11th passed the junction of the Buyanta with the Zabkan, and followed the latter, seeing beyond it a range of sandhills running parallel. The heat was greater—85° in the cart—and we were obliged to run camels tandem, and the next day even three were hardly enough to pull through the heavy sand. The river-bed was refreshingly green, covered with ponies and sheep, and showed more population.

"OM MANI PADME HOM," IN WHITE STONES ON HILLSIDE.

We crossed early on the 12th to the left bank, before which the sand-range had ceased, and the next day parted company with the river at Argalingtu, where it turns north-west, and ourselves continued west till at 2 p.m. we reached Panga Nor—Ney Elias' Lake Baka—and had the usual good reception. I liked the Mongols the more I saw of them; they have all excellent manners, frank and manly. Ponies were here attached to the cart for the first time. A 12-foot pole was tied across the shafts and carried by the men, two at each end, on the saddle in front of them, others attached ropes to the pole, and in this way eight at times were pulling. And they were none too many, for we here began the passage of the sand-range, so admirably described by Mr. Elias. It took us from 2.30 p.m. till dark, and I can quite understand the danger in one of the gales so prevalent, when the track is obliterated and every landmark changed. I walked the whole distance, and found that the only hard portion of the sand was at the very crest of the ridges; everywhere else the ponies sank fetlock-deep, while the grades were excessively steep. We had in all some twenty ponies, besides the baggage camels, and were relieved to have got safely across. There is, of course, no water, and, beyond some reedy grass and a shrub or two, no vegetation. The shapes given to the hill-tops by the wind are fantastic, and the hollows, 100 yards wide and as many feet deep, scooped by the same agency as clean as out of a cheese, are weird. From the highest point I saw to the east Panga Nor, with its plain and hills beyond; before, behind, and around me the sandhills, some 200 feet high; to the north-west the Turgen Nor, with snow-clad mountains beyond; and over all the declining sun gave a wonderful colouring. At the station below the range I said good-bye to the excellent fellows who had brought me over. The currency west of Urga is in waste silk handkerchiefs, and I was glad to add to their tips in these sweetmeats, cheroots, etc., for they deserved it. The Mongols are born horsemen; many of my escort were twelve years old, and the way they took the deepest nullahs, the worst corners, with perfect nerve, laughing and chatting, at 12 miles an hour, with nothing but kindness to their ponies, is one of the pleasantest recollections of my journey.

We rounded the south shore of the Lake Turgen, then by a pass, at first easy, after rocky and tortuous, when the boys had it all their own way, and I had not the heart to check them, we crossed the range, and beyond it came to a lake—Chagan—then dry, and not in Ney Elias' map, or mentioned in his paper, so our routes here may have differed. On the 15th we came across a strong stream in an evidently artificial bed, but without a sign of cultivation from it; it flowed into the Chagan. After a day, trying from heat and rocky road covered with clumps of tussocky grass, we reached Hŭrăs—Elias' Hara—most of its surface covered with tall reeds.

On the 16th I looked down on Kobdo, and was met by the entire Russian colony, who placed rooms at my disposal, and were most kind. Having shortly to return Liu San into store, I was glad to meet here a German-speaking Russian, who accompanied me to near Tomsk, where he left me in the night, after having cut open my Gladstone bags with a knife, a present from myself, and abstracted three "shoes" of silver, value about £30. It was lucky he took no more, and stayed so far. I fear the limitation of his takings was due rather to ignorance than to his own moderation. The conditions of the little Russian communities in Urga, Uliassutae, and Kobdo are much the same. In the first the chief interest is the tea transit, and this will cease as soon as the Siberian railway is completed. It now takes a year from Tientsin to Irbit, the mart from which it is distributed over Russia; it will then go from Hankau to Vladivostock, and reach its destination in fewer weeks than now months. The loss to Mongolia will be great. In all three towns the trade is petty, and the goods, of course, mostly Russian, nothing English, the exports hides and cattle. Kobdo, like Uliassutae, is open, with a separate Fort for the Chinese officials and garrison; the former were helpful.

I left on the 18th, greatly pleased with Kobdo, which reminded me of a well-kept Indian cantonment, the streets broad, straight, lined with a tree like the peepul, and with a strong clear stream flowing down each side. The running water and green foliage would have made any place agreeable, but after all these weeks of treeless travel, and with the knowledge of successful completion of the journey, they enhanced the pleasure.

STARTING FOR THE SANDHILLS.

The rest may be dismissed shortly. The course now lay north. At 10 a.m. of the 21st we reached the river Kobdo, but were stopped at a point where we had to pass between it and a hill, from which enormous boulders had fallen. The ponies were taken out, the cart emptied and carried bodily over the obstruction; we then reloaded and inspanned, and trotted a mile or two to the ferry, where we crossed on a frail platform—on three dug-outs lashed together—a deep, strong stream some

400 yards wide. We reached Suok by 9 a.m. of the 22nd, crossed the Suok pass in the forenoon of the 23rd, and at the outlet of its valley halted on the edge of the splendid plain which divides Mongolia from Siberia. One more change of ponies, and then towards evening I was landed at Koshemot, the Russian customs station.

With base ingratitude, I was delighted to exchange the cart which had brought me so far and been so useful for riding ponies, and I have rarely enjoyed anything more than the route to Ungodhae down the valley of the Chui. We started after noon of the 24th, a party of the Russian residents accompanying me a couple of miles, a kindly courtesy, and through beautiful Swiss scenery in a country of milk and honey, we reached Ungodhae early on the 28th. Words fail me to do justice to the exquisite beauty of the country here passed through. There was population with cultivation, herds of cattle, and ponies of a good size, a general look of rough comfort, and much hospitality.

From Ungodhae there was the usual post travelling on fair roads in Telegas *viâ* Biisk and Barnaoul to Tomsk, which was reached at midnight on July 5. I caught the next day's steamer, which reached Tiumen early on the 14th; thence by train to Perm, arriving 9 a.m. of the 16th; caught a steamer just starting, and reached Nijni Novgorod at 10 a.m. of the 19th; whence by train to Moscow and St. Petersburg, and so home by sea to Hull, where landed on July 29.

NOTE ON MR. BORRADAILE'S PAPER.

By NEY ELIAS.

THOUGH Mr. Borradaile's paper is short, it is the record of a very long and, in some respects, arduous piece of travelling. It is not often, nowadays, that a traveller accomplishes a journey of such an extent, in a little-known country, so quietly and unostentatiously as Mr. Borradaile has done, or that the troubles and difficulties of the undertaking are made so light of. The first that is heard of his enterprise is that he has carried it to a successful conclusion, and has returned to England. This is in accordance with the best traditions of exploring travellers, and invites recollections of the great expeditions of Mr. Borradaile's colleagues of the Bombay Civil Service—Mr. A. D. Carey in Eastern Turkistan and Tibet, and Mr. H. E. M. James in Manchuria.

Northern Mongolia lies somewhat out of the range of English travellers, and has been left, for many years, almost entirely to the Russians to explore and survey. Thus it was a Russian savant, M. Yadrinzeff, who first brought to light (in 1889) the ruins of the ancient Uighur and Mongol capital, Karakorum, though Mr. Borradaile has the satisfaction of being the first Englishman to visit them. That he did not make any attempt to examine them closely is only natural, seeing that shortly before his expedition they had been thoroughly investigated by the Finno-Ugrian Society's party, while the archaic Turki inscriptions, to be found among the remains, had been studied and translated by such masters as Dr. W. Radloff and Professor Thomsen of Copenhagen. Mr. Borradaile, however, rightly appreciates the interest that lies in this ancient centre of the Uighur race, and in the records of their times that have been preserved for some twelve hundred years, in the stone fragments which he saw.

The Uighurs are a people with a history. The early part of it is briefly sketched by the writer of the paper, who tells us of the final ruin that overtook their state in Northern Mongolia, near the middle of the ninth century, in the shapes of famine, pestilence, and crushing defeats at the hands of other Turki tribes—calamities, he remarks, that completely blotted them out. This was the case as far as their kingdom and political unity were concerned, but to kill down a whole people and remove them from the face of the earth, an agency even more powerful than disasters such as these must be called into play. The great destroyer "time" failed, in this instance, to ally itself with the other enemies of the Uighurs; and thus, though their ancient state in the Altai region came to an end, and though their numbers, no doubt, became greatly diminished, the remnant of the people sought a new home, and migrated southward beyond the Gobi. Here, on both the northern and southern slopes of the Transhan, they built up new kingdoms or confederacies of states, known as Bishbalik, Kaochang, Kuitze, etc.—the modern Urumtsi, Turfan, and Kuchar—and gradually rose again to power and influence.

Later, in the twelfth century, their territory extended much farther westward, and a line of Uighur monarchs, known as the Kara-Khans or Ilak-Khans, with their capital sometimes at Balasaghun, on the upper Chu, and sometimes at Urdukand (the modern Kashgar), ruled all Central Asia between Samarkand and the borders of China. In this latest and most westerly kingdom, their chiefs became Musulmans, though the mass of the people seem to have retained Buddhism until, perhaps, within the fifteenth century. They were a cultivated race, skilled in arts and crafts, and much given to literature; and though not sufficiently warlike to hold their own against invaders who, from the twelfth century onwards, overran Eastern and Western Turkistan and the region we know now as "Jungaria," still they were a people who proved themselves hard to eradicate or even to displace. They may be said to live to the present day, in the populations of Eastern, or Chinese, Turkistan, and of the Ili region, and may be regarded as the parent stock of the modern Turkistanis, among whom the old Turki type and language have survived all the vicissitudes that can well befall a nation. These communities of Uighur origin may still number, perhaps, some two millions of people. Though Musulmans, now, of some three to four hundred years' standing, the territories which they occupied from the ninth century to the fourteenth, as Buddhists, are believed to abound in remains of their religious and sepulchral buildings, and other traces of their ancient civilization, which may, one day, prove as interesting to the historical explorer as those of Karakorum and its neighbourhood.

The journey described above by Mr. Borradaile is not the first that he has made across the Asiatic continent; he had once before travelled from the Pacific to the Baltic, though by a more northern line than the one followed last year. On this second occasion, it will be seen that his route lay to the east and north of the one taken by me in 1872, and that the two only come together at Uliasutai. From that point forward, they were nearly, though not quite, identical. This is the first time, as far as I am aware, that the Chinese settlements of North-Western Mongolia have been visited by any but Russian travellers since 1872; and it is interesting, when reading Mr. Borradaile's description of Kobdo, during summer, and its present flourishing state, to compare it with the condition in which I saw it. It was winter-time then, and winter in the north of Mongolia is not very different to the same season in Siberia. The place, too, had been attacked, only a few days before my arrival, by a force of Tunganis from Manas. The Chinese garrison had been beaten, as a matter of course, and had shut themselves up in the fort, where the enemy, for want of guns, was unable to touch them. The Tunganis had looted and burned the open town, however; while the charred and ruined buildings, the headless bodies of the killed, and the wreckage of household furniture and merchandise, which lay scattered on every side, gave the place, as may be imagined, very little of the aspect of "a well-kept Indian cantonment," which it bore when seen by Mr. Borradaile. Uliasutai was, at that time, in a very similar state of ruin to Kobdo, for it had been attacked and burned, in much the same way, a few months previously; but Mr. Borradaile's paper does not mention the appearance of the eastern settlement after twenty and odd years of peace.

During his rapid journey, Mr. Borradaile was not idle with his camera. He has brought back many interesting views of the scenery of the country he traversed, and of the places he visited—among them some of Karakorum—and many portraits of individual Mongols, which serve to show the type and costumes of the inhabitants.

DR. PENCK ON THE MORPHOLOGY OF THE EARTH'S SURFACE.*—REVIEW.

By Professor CHARLES LAPWORTH, F.R.S.

THIS welcome work, which is as excellent as it is opportune, forms the latest number of the well-known Library of Geographical Handbooks, edited by Professor Friedrich Ratzel. Commenced by the author more than ten years ago, when the science of Orology or Earth-morphology was practically in its infancy, and growing with the rapid development of the subject which has taken place of recent years, it has all the novelty and freshness of an original essay, and supplies a want which has been keenly felt, not only by geographers, but by geologists.

It is another proof of the tact of the Editor of this Geographical series that he entrusted the writing of a general work upon this subject to Professor Penck, who is as well known as a geologist as a geographer, and whose papers are as warm with scientific enthusiasm as they are masterful in their handling and presentation of their subject-matter. Since the preparation of this work was commenced by the author, two great works have appeared in Germany bearing upon Earth-morphology, namely, Suess' 'Antliz der Erde,' and Richthofen's 'Führer für Forschungsreisende.' The important effect of both these books upon his own work is frankly acknowledged by the author, as is also that of the publications of the great American geologist, Dana, whose grateful scholar the author in his preface subscribes himself. But although the influence of these three authorities is evident throughout the work, it is by no means predominant. Dr. Penck, with all his receptivity, never loses his individuality. He marshals his facts, digests his materials, and draws his conclusions in his own way; and he lights up his results stage by stage, by fresh calculations, observations, and characteristic modes of presentation of the subject-matter, often as bold and ingenious as they are original.

The work is divided into three "Books"—the first treating of General Surface Morphology; the second, of the Land; and the third, of the Sea.

In his Introduction, the author points out that the surface of the land is composed of a series of recognizable *forms*, which vary from sharp mountain battlements to long winding valleys, and by their ever-varying association bring about the special *landscape* characters of different regions. But, varied as are these forms, each is in itself merely a trivial deviation from the general spheroidal Earth-form, the surface of which is typified by the sea-level, and from which, as a datum plane, these minor forms can be measured and combined. Each *form* has a certain size and position, and to fix these we must have recourse to Geodesy. Each has had a special mode of origin, and is now undergoing certain changes, and to understand these we must turn to Geology. But the distribution and combination of the Earth-forms are matters belonging to the science of Geography. Earth-morphology, therefore, is related to three distinct sciences; but in its essence it must be classed as an integral part of geography, regarded as the doctrine of the surface of the Earth.

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* 'Morphologie der Erdoberflache.' By Dr. Albrecht Penck, Professor of Geology in the University of Vienna. Stuttgart: J. Englehorn. 1894.

Tracing the history of the study of Earth-morphology from the days of Varenius down to the present time, Penck shows that the fixation of certain morphological terms in geography is more than a century old, and that the science of geology—which was originally nothing more than a General theory of the Earth—actually engaged itself primarily with the origin of the forms of the Earth's surface. Both Wernerites and Huttonians treated of the subject, but as geology advanced its students turned more and more from observation of form to the study of structure; and it was only by a roundabout path that even geologists at last realized the fact that the surface-forms of the Earth-crust could be explained in a geological way. J. R. Leslie was the first who recognized the connection between inner structure and superficial form, and opposed topography as an *art* to topography as a *science.* To the hint which Leslie gave, Penck ascribes the great success that morphological geography has attained in America, in the works of Gilbert, Dana, and others; and in Britain, in the works of Ramsay and Sir Archibald Geikie. But all such discoveries were the work of geologists, and it is only of late years that geography has availed itself of these advances. To Peschel belongs the credit of having led back geographers to the sphere of genetic morphology. His brilliant essays on the subject were the turning-point in the geographical application of the doctrine of the surface-forms of the Earth. At his incentive "Geography regained a long-neglected heritage." The German geographers who succeeded him rapidly availed themselves of the materials worked out by British and American geologists, and, finally, all the old formal classifications were replaced by the complete genetical grouping proposed in Richthofen's masterly 'Führer für Forschungsreisende;' while French literature has been enriched by De la Noë and Margerie's 'Formes du Terrain.'

This Introduction is followed by a chapter on the form and size of the Earth as a whole, in which Penck gives the latest calculations as to the slight deviation of the true form of the Earth from an ellipsoid of rotation. He shows how the standard sea-level adopted in different countries varies with respect to the selected ellipsoid; and discusses the discrepancies in distances obtained by astronomical and geodetic measurements respectively, and in heights as affected by barometric pressure, refraction, and the like.

Chapter II. is devoted to morphography and morphometry, and the various forms of the Earth's surface are defined, their peculiar characteristics and their proposed classification sketched in outline. The author considers that these *forms* may be regarded as marked out by their surface slopes, and as limited by the edges formed by the meeting of these slopes. Such morphological units or *form-elements* combine to build up *unit-forms*. Many similar unit-forms occurring in association combine into special *landscapes* or groups. These, again, are subordinate sections of greater complexes, denominated spaces or *areas*. The form-elements, unit-forms, landscapes, and areas constitute, with their innumerable transitions, the morphological types of the surface of the Earth.

After a mathematical treatment of the development of the characteristic lines and surfaces of these Surface-forms, the author next takes up the discussion of the relationships of the land and water regions of the globe. The sea *space* is sharply distinguished from the land *mass*; and their respective sub-aërial surfaces as the *land* and *water areas*. The ratio of water-area to land-area is given as 2·54 to 1; and the fact is pointed out that the reduction of the land area in passing from pole to pole is of such a character that, in any two corresponding zones in the north and south hemispheres taken together, there is generally the same proportion of water to land, the ratio varying from 2·7 to 3·4. The great distinction between the continental *block* and the ocean *room* is trenchantly insisted upon, and the great morphological importance of the land hemisphere as opposed to the water hemisphere is pointed out; but the grouping of the lands around the North Pole is dismissed as of trivial significance. The minor divisions of the land and water areas are next carefully and naturally grouped, and this chapter concludes with a historical summary of the views of others with respect to the so-called geographical homologies and affinities, many of which the author is inclined to regard as valueless, because of the instability of the coast-line.

The author next treats of the vertical development of the Earth's surface; and the *continental* and *abyssal* regions are carefully defined and opposed. The mean surface-level of the Earth-crust is (with reference to present sea-level) calculated at −2435 metres, in place of −2560 as worked out by Dr. Mill, −2900 by De Lapparent, and −2285 by Heiderich. The author points out how the generalized hypsographic curve of the Earth's surface defines the continental plateau as limited exteriorly by the 100-fathom line; and that between this line and the broad and deep abyssal region of the ocean we have, normally, a steep-dividing (septal) slope. This slope he regards as the shore of the continental block, and denominates it the *aktic* (steep shore) *region* of the Earth's surface. He considers that the line of mean-sphere-level runs, as a rule, along the bottom edge of this aktic region; but shows that in some areas the aktic slope is practically undefined, while in others—as off Japan—it descends to the greatest depths of the ocean floor.

In dealing with the areas and volumes of the land and water sections as related to the mean surface-level, Dr. Penck estimates that 200,000,000 of square kilometres occur above that level, and 279,000,000 below; and that $\frac{1}{2000}$ of the Earth's volume must be taken off the continental block and laid upon the ocean floor to bring the surface of the two to a common level.

Assuming, next, that the waters of the globe constitute part of its mass, and regarding them, theoretically, as becoming condensed into a corresponding mass of solid rock, such mass forming a continuous shell exterior to the present mean sphere-level, he calculates that the true *condensation level* of the Earth-crust thus obtained would lie at 1380 metres below the present sea-level, or 1055 metres above the mean crust-level of the present day. He argues in favour of the view that the floor of the ocean has a higher specific gravity than that of the continents; and agrees with those who hold that the present distribution of the land masses has a disturbing effect upon the Earth's axis of rotation.

In the well-worn matter of the doctrine of the permanence of continents and ocean basins, we find the author in general accord with the views of Dana, Murray, Wallace, and others. He points out that the various parts of the present Earth's crust are divisible into relatively *stabile* and *labile* regions. According to his view the grandest stabile regions form the central spreads of the continents, and the central spreads of the ocean deeps; but there are many others of minor consequence. The labile regions are remarkable for rapid variation in surface elevation within short distances (or, in other words, the lability of the Earth-crust is in some way connected with the surface gradient). These labile regions lie, some upon the land, and some below the sea-level, and vary in position in the course of geological time; so that it is probable that within ancient labile regions of the Earth's surface now forming parts of the stabile areas of the continents, portions of old sea-floors have been elevated into land; while in depressed labile regions now sunk below the sea-level, old land surfaces may have been carried down into the depths of the sea. He shows, however, that the continental plateau, considered as a whole, is extremely old, and he adduces mathematical calculations to prove that the ocean depths are probably of like antiquity.

In the second Book, we enter upon the detailed description of the various *forms* recognizable upon the lands of the Earth. The first chapter is introduced by a generalized account of the main features of the land surface, their morphological and structural characteristics, and their mode of origin. The section on regional structural peculiarities is largely geological. We have a short account of the stratified and igneous rock-formations, their disturbances and dislocations. The chief structural types are grouped according as their rocky floors are composed of stratified or of massive rocks. Of the stratified types we have the *new land*, where the strata are practically horizontal; the undulated or *warped land;* the *schollen land* or fracture-land; and the *fold land*, with its sharp anticlinals and synclinals, over-faults and thrust-planes. The regions composed mainly of igneous material are grouped as the *effusion land* (mainly volcanic), and the *intrusion land* or *stock land* (mainly plutonic). None of these fundamental structure types, however, occur unmodified; but there is a prevalent discordance between the topographical and geological surfaces, brought about by denudation, erosion, deposition, and their associated agencies. From this point to the close of the first division of this second book the author travels over ground more or less familiar to the student in the works of other authors, treating of weathering, transportation, river and glacial action, and the like; but he adds an abundance of novel material, and the whole discussion is clear and adequate.

The succeeding division deals with the endogenous processes—crust-movements, vulcanicity, etc.—and its concluding section is of peculiar interest. The author distinctly leans to the opinion that most of the known facts and phenomena point in the direction of the theory that the cooled Earth-crust rests upon a soft, cushion-like stratum of latent plastic matter, so that it is in a kind of hydrostatic equilibrium. According to this view, the earth is a globe of gas enveloped by an inner magma layer and an outer solid crust. Proceeding from the surface inwards, we should probably meet with a succession of uncertainly bounded states of matter, which might be conveniently typified by glass, shellac, pitch, molasses, oil, water, and gas, each passing insensibly into the next below, and each downward layer being marked by a further increase of temperature.

The processes at work in the genesis of the land-forms having been thus fully discussed, the author next enters upon the detailed description of the actual forms themselves. The *plains* are first described; and in connection with this branch of the subject, a section on the appearance of "*plain formations*" in the geological systems is given, which is certain to become classical. The characters of *uplands*, hills, valleys, and glens are given in great detail; and the mountain features due to erosion, etc., such as plateaux, peaks, gorges, and passes, are all united and explained under the title of *valley landscapes.*

This is followed by a section in which are described the natural *hollows* or *basins* of the land surface—lakes, inland seas, desert depressions, etc.—and great stress is laid upon glacial phenomena and the erosive action of glaciers. A long section is devoted to the characteristics of the *mountain regions* proper. Here we especially trace the influence of the work and opinions of Dana, Heim, and Suess, but the author has largely extended and illustrated their facts and their results.

The last book (Book III.) is consecrated to the study of the *Sea* and its coasts; to the work of the waves and tides, etc.; to the formation of deltas, coral reefs, and to the secular movement of the coast-line. In the description and classification of coast-lines—as flat coasts, embayed coasts, overlapping coasts, etc.—the author frequently follows Richthofen; largely, however, adding to his materials and opinions. The form of the sea-floor (both that of the shallow seas and of the ocean depths) is treated at length, and much new evidence is brought forward of the extraordinary steepness of some parts of the floor of the ocean basin. In the last chapter the author treats of Islands. He classifies the continental islands into coastal islands, islands of the shallow seas, and islands of the aktic slope. Finally, we have a section upon the oceanic islands proper; and, in the matter of reefs and atolls, the author leans distinctly to the views of Darwin. A summary of the literature of this branch of the subject concludes the book.

Professor Penck's work is an encyclopædia of facts and conclusions, admirably classified and digested; and affords, at the same time, a complete index to the literature of the subject. We hope soon to see an English translation; for it is a book which should be in the library of every working geographer and geologist. We have here endeavoured simply to give a general idea of the scope and bearing of the work, and have not attempted to criticize any of its conclusions. In the science of geo-morphology there are so many novel and interesting facts upon which we can all agree that we may well forget that we do not all of us interpret these facts in precisely the same way. Like all great text-books, Dr. Penck's work will prove a conspicuous landmark, up to which to measure our advance, and from which to estimate the amount of our future progress.

Those fairly acquainted with the subject might, perhaps, be inclined to draw a comparison between Dr. Penck's book and the works of some other authors treating of the same subject. In the arrangement of his materials in the second half of his work, the author closely follows Richthofen's, 'Führer für Forschungsreisende.' But Richthofen's book, scientific and practical as it is, is very different in its aim. In that work the Prince of Forschungsreisende is like a generous host, who frankly exhibits and modestly explains to the guests—his brother travellers and scientists—the rich collections which are the accumulated results of the experience of a lifetime. In reading Suess's 'Antliz der Erde,' we are all of us out together in the great world-field, not only as students, but as companions of the master, sharing in his enjoyment of the crowds of facts as they are successively unearthed, and careless of provisional conclusion in the mean time, in the comfortable conviction that we have but one common object in view, the ultimate discovery of truth. In Dana's works, we are subjugated by battalions of facts, and hurried forward by force of evidence and breadth of conclusion. In Geikie's works on 'Scenery and Geology,' we are under the guidance of the poet as well as the master, and the driest facts and phenomena grow alive and warm with a kind of human interest; the subject captivates us, not only through our reason, but also through our emotions, and our progress is the more certain because it is instinctive and unconscious.

Dr. Penck's methods certainly approximate most closely to those of Dana, but there is a more conspicuous consciousness of power and closeness of grip, which is personal and characteristic. The author's mind is dominated, above all, by the importance and the unity of his subject. For its speculative or poetic side he has little or no regard. Confident in the rectitude of his aims, and secure in the support of the nation of facts and phenomena at his back, he moves straight ahead to his goal, leaving the pupil to follow or to faint, as his will or his powers may decide.

Which of the four methods is the best it is impossible to say; but certainly, for one who is determined to know all there is to be known on the subject of Earth Morphology, there is no better guide than the work before us.

HYDROGRAPHIC RESEARCH TO THE NORTH OF SCOTLAND.

The Fishery Board for Scotland recently co-operated with the Swedish, Norwegian, German, and Danish governments in making a series of investigations into the physical condition of the Baltic and North Seas, at four periods three months apart. The area assigned to the Scottish investigator had the Shetland Islands as its centre, and included parts of the North Sea, and the great depression of the Norwegian Sea called the Faeröe-Shetland Channel, which is separated from the Atlantic by the narrow Wyville Thomson ridge to the north-west of Cape Wrath. Mr. H. N. Dickson was appointed to carry out a series of soundings, and of temperature observations and salinity determinations at various depths on board the fishery cruiser H.M.S. *Jackal.* His report has recently been published.* It is to be regretted that no special grant was apportioned to the Board when requested by Government to carry out this work, and that its income for scientific purposes is inadequate. Mr. Dickson was thus unable to carry out his investigation with the same completeness as the observers of the other governments engaged in the work. He has, however, made the best possible use of his opportunities, and the result is a valuable contribution to our knowledge of oceanic movements, which is likely to prove of economic as well as of scientific interest.

In the area surveyed, we have to consider the shallow North Sea, with its fresher water modified by the brackish Baltic, and liable to considerable seasonal variations; the deep, cold mass of the Norwegian Sea; and the warm Atlantic waters. The general circulation is conditioned by many complex factors, amongst which may be enumerated—(1) configuration of the sea-bottom, (2) tide, (3) wind, (4) temperature, (5) salinity; the two last combining to determine the specific gravity of the waters. Mr. Dickson agrees with Professor Mohn in assigning a cyclonic, or counter-clockwise, circulation to the waters of the Norwegian Sea, but differs from him in his description of the currents in the Faeröe-Shetland Channel. The water in the Norwegian Sea, moving in a direction against watch-hands, impinges on the steep slopes of the continental plateau to the north of Shetland, and is divided, one part continuing the cyclonic motion, another part being deflected into the Faeröe-Shetland Channel, up which it passes as a cold under-current until it encounters the Wyville-Thomson ridge. Over this bank the Atlantic water flows as a warm upper current, impelled by the wind especially in winter, and by its greater temperature, and consequently higher level, than the colder Norwegian water. The motion of this current over the ridge draws up the colder water from below, and a mixing of the two results, which is more rapid as the surface current is the speedier and consequently more of the under water drawn up. In warm and windless summers, this Atlantic water, deflected by the rotation of the Earth, accumulates to the north-west and north of the Shetlands and tends to mix with the water of the North Sea. Such a mixture is facilitated at all seasons of the year by the tidal currents, which partly flow between the Orkneys and Shetlands, carrying surface water with them, and partly skirt the west of the Shetlands, an eddy being formed between the two streams, into which North Sea water is drawn. In winter and spring, tidal action alone brings about this penetration of the Atlantic water into the North Sea, as the fresher North Sea is really heavier than the Atlantic water, owing to its greater coldness. In summer the supply of fresh water is less, but the surface is warmed sufficiently to give it a lower specific gravity than the colder under-layers. This complex mass, consisting of a warmer, salter surface layer and colder fresher layer below, meets the Atlantic water and mixes, the upper water becoming cooler and salter, the lower warmer and salter, whereas the Atlantic waters are warmed and freshened above, cooled and freshened below. When the saltness of one water and the coolness of another combine in the most marked manner, an axis of maximum specific gravity results, which in May and June runs north-east from the Shetlands, then turns to a north and south direction, and moves further to the east later on, until about the end of September, when the winter conditions begin to prevail. This axis of dense water allows Atlantic water to come round the north of the Shetlands, and determines its spread along the east coast of Scotland during July and August.

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* *Twelfth Annual Report of the Fishery Board for Scotland,* Part iii., "Scientific Investigations," pp. 336–382.

Mr. Dickson does not tell us in this paper about the relation between this periodic influx of Atlantic water round our east coasts and the periodic migrations of herring. We believe some connection between the two has been suggested; at any rate, it seems a profitable direction in which to continue this important national research. Should such a relationship be proved to exist, there would be no difficulty in ascertaining the proportion of Atlantic water roughly at any time, as it is bluer in colour than that of the North Sea. A simple colour-tester has been constructed by Forel, which would enable a fisherman to readily distinguish regions where the Atlantic water was largely present, and this Mr. Dickson has used with satisfactory results.

A satisfactory result of elaborate density-determinations of water samples collected by him on his four cruises, and examined by Mr. Anderson at the Scottish Marine Station, is that the hydrometer is a reliable instrument for ascertaining specific gravities at sea, if proper precautions are observed. This is important, as it restores confidence in the innumerable density observations of the *Challenger* and other expeditions from which the maps of distribution of salinity for the oceans have been prepared.

Mr. Dickson's work is an important contribution to oceanography, and, when taken together with the monumental researches of Professor Pettersson and his colleagues,* promises at last to place our knowledge of oceanic movements near our own coasts on a satisfactory footing. We must specially commend the admirable isothermal maps of the water-layers at different planes of depth, which throw much light on the circulation of this part of the ocean, and in themselves are no small contribution to physical geography.

THE "ANTARCTIC'S" VOYAGE TO THE ANTARCTIC.

By C. EGEBERG BORCHGREVINK.

WHEN the steamer *Antarctic* left Melbourne in September last for a whaling cruise in the Southern Seas, she carried with her Mr. C. Egeberg Borchgrevink, who was desirous of making a scientific expedition to those latitudes. This gentleman had endeavoured to obtain a passage on board, but, being unable to do so owing to lack of accommodation, he shipped as a seaman. During the voyage, however, every assistance was afforded him in his scientific labours, and at a meeting of the Royal Geographical Society of Australasia in Melbourne on March 19, he read an interesting paper, of which the following summary has been sent to us:—

The *Antarctic* left Melbourne on September 20, 1894, and we dropped anchor at Hobart on October 2. We left that harbour the following day, and it was originally our intention to spend a few weeks in search of sperm whales off the south-west cape of Tasmania. Not meeting with any, we steered for Royal Company Island. On the 18th we had snow on board for the first time. It came in heavy squalls, and brought a large specimen of *Diomedea exulans*, or large albatross, on board, where it took refuge until the weather cleared. At night it was moonlight, with a completely clear sky, and at twelve o'clock the Aurora Australis was visible for the first time. With white shining clouds, rolling from west towards east, it formed into a shining ellipse, with an elevation above the southern horizon of 35°.

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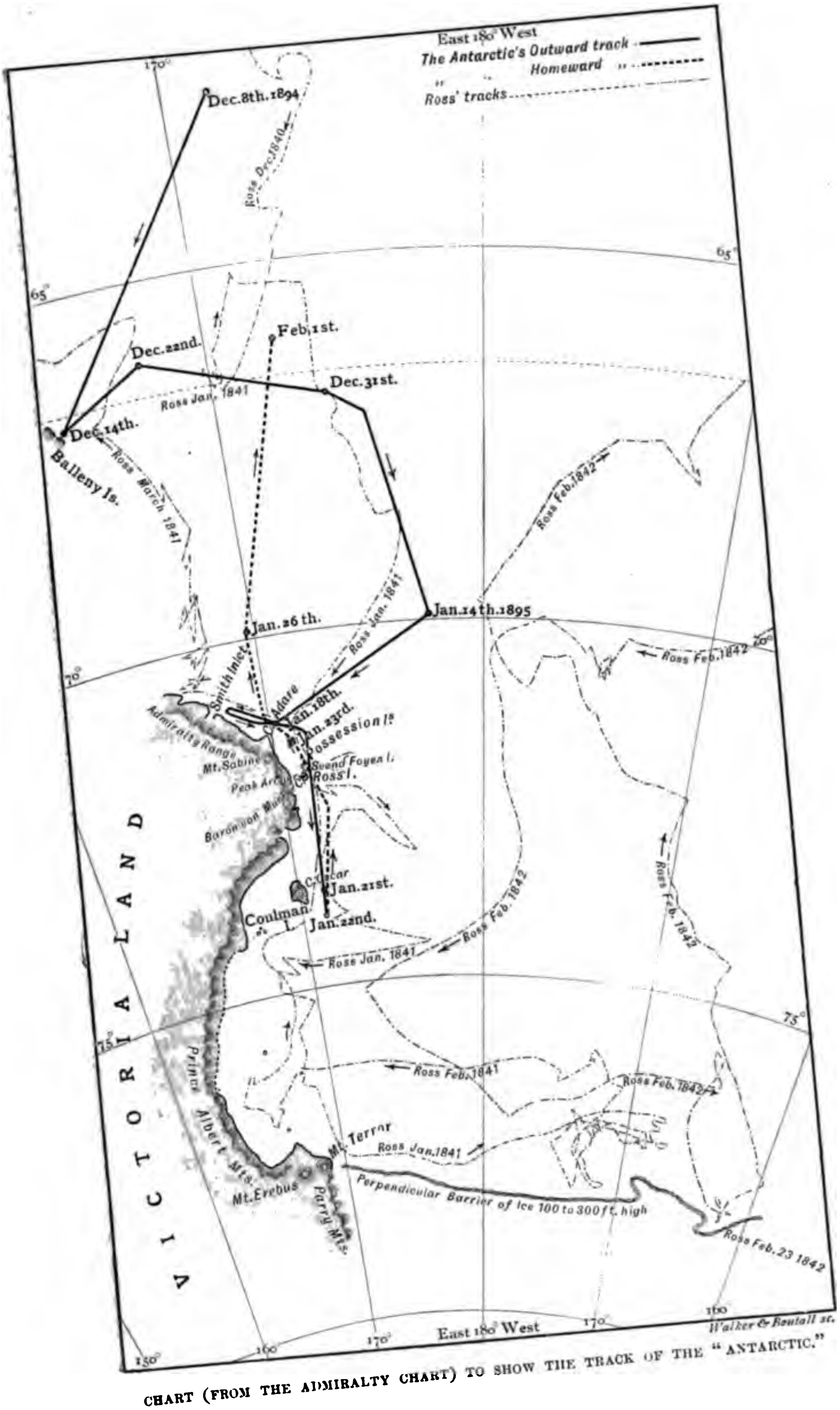
* *Scottish Geographical Magazine*, 1894, *passim*.

The *Antarctic*, being at the time at the vicinity of Macquarie Island, and thus in lat. of about 54°, the aurora seemed constantly to obtain its light-force from the west, and the intensity of its light-cloud culminated in strength every five minutes. After the lapse of that time it suddenly died out, to regain its former magnificence and beauty during the succeeding five minutes. Upon our primitive compasses I could discover little or no influence that night, and the phenomenon lasted until 2 o'clock, when it was gradually lost in an increasing mist. As the swell was heavy, and as there was little probability that any material benefit would be the result of landing, we set out for Campbell Island on the 22nd, and dropped our anchor in North Harbour on the eve of October 25, shifting the following day down to Perseverance Harbour to fill our water-tanks, and to make final preparations before proceeding south. Campbell Island shows from a great distance its volcanic origin and character, undulating ridges rising in numberless conical peaks from 300 to 2000 feet above the sea-level. Although the island seems desolate enough from the sea, the land around the base is rich in vegetation. While there hunting for ducks, which were about in great numbers, I came upon three snipe (*Gallinago Australis*), which I succeeded in securing.

We weighed anchor on October 31, and, when close to the south shore of the island, we sent a couple of boats in search of seals. On this occasion one of the boats was swamped in the surf and immediately crushed against the rocks, its crew having a rather narrow escape from drowning. During the next few days, proceeding further into the fifties, the air and the water kept in equal temperature, 44° Fahr. A large number of penguins were seen, jumping about like small porpoises. We met several icebergs from 100 to 150 feet high. These bergs were a solid floating mass of ice with perpendicular walls, and formed an unbroken plateau on the top.

On the 6th, in 58° 14′ lat. and 162° 35′ E. long., we sighted an immense barrier of ice or chain of icebergs, extending no less than about 40 to 60 miles from south-east to north-west, or in fact as far as the eye could reach, the highest point being somewhat over 600 feet. This barrier was of a dark greyish colour, and at a distance much resembled land. Several icebergs, similar to those we had met before, were floating about in all directions, and were undoubtedly children of this enormous monster. It was here that we discovered that our propeller was out of order; the news came as a fearful blow to all of us. Such an accident when amongst the ice on the preceding day might have proved fatal, as at one time we had to carry a press of sails and set the engines at full speed to manage to clear our way between two large bergs. Not judging it prudent to proceed amongst the ice with the vessel in so crippled a state, the *Antarctic* was again headed northwards; and, favoured by strong gales from south-east, we anchored in Port Chalmers on the 18th, where the damage was soon repaired. Having got some fresh hands from Steward Island, we stood again southwards on November 28. Favourable winds, with the barometer about 29 inches, continued till we again reached the fifties. By the time we reached 55°, the albatross had left us, and likewise the Cape pigeon (*Daption capensis*), but the white-bellied storm petrel still followed in our track. A lestris (skua), with dark brown head and white-bordered wings, and a small blue petrel, put in an appearance; I longed to be able to secure one of these birds, but never had an opportunity. On December 7 we sighted the edge of the pack-ice, and shot our first seal, which was of the common grey kind, its skin being injured by several deep scratches. We had a very strong snowfall, and the vessel was for the first time covered with snow on deck and the rigging. On December 8,



Walker & Boutall sc.

CHART (FROM THE ADMIRALTY CHART) TO SHOW THE TRACK OF THE "ANTARCTIC."

lat. 62° 45', long. 171° 30' E., large streams of ice were drifting around us; a strong ice-blink appeared towards the south, and the presence of the elegant white petrel (*Procellaria navea*) gave us unmistakable evidence that now we had before us those vast icefields into which the gallant Briton, Sir James Ross, fifty years ago, on January 5, 1841, successfully entered with his famous ships the *Erebus* and *Terror*. In the evening we slowly worked our way in between the large floes of the outer edge of the pack-ice, which consisted of large and heavy hummocky ice.

Of marine animals, I saw multitudes of the *Argonauta antarctica* everywhere in the pack, usually found to be swimming about in cavities in the ice-floes, evidently seeking a refuge from their enemies, the whales, which feed principally upon them. The large finned whales, or what in Norway are called blue whales, were spouting about in all directions; but, not being fitted out with the necessary appliances to kill these monsters, we had, after several unsuccessful attempts, to leave them alone.

The white petrels were numerous here, and I secured some of them. The white-bellied petrel departed at the edge of the pack, leaving the icy regions to its hardier brethren, the black-bellied petrel. We shot several seals, but they were scattered about only sparsely, and we seldom saw more than one or two together, and never more than seven, most having scars and scratches in their skins.

Sir James Ross noticed similar wounds on the seals, and it was supposed that they had been inflicted by the large sharp tusks with which the sea-leopards are provided, and these wounds were received in battles amongst themselves. My opinion, however, is that these scars must be traced back to an enemy of a different species than the seal. The wounds are not like the ordinary cuts inflicted by a tusk or tooth; varying from 2 to 20 inches in length, they are of a straight, narrow shape, and where several of these cuts were together on one animal, they were too far from each other to have possibly been produced by the numerous sharp teeth of a seal. The wounds went always far into the blubber, and sometimes right into the flesh. That this unknown and destructive enemy of the seal in those waters is of a superior and more dangerous kind than the seals themselves, I conclude from the fact that the wounded seals never had any scars about their head and neck, which undoubtedly would have been the case if any battles were fought amongst themselves. If my opinion holds good, it may serve as an explanation of the strange scarcity of the seals in regions where one would think these animals should be found almost everywhere.

When we entered the pack the temperature of the air was 25°, that of the water 28°, which latter temperature was kept all through the pack-ice. Penguins were in great numbers on the ice-floes, and we had no difficulty in killing them, although we had many a hard race after them over the usually snow-covered ice-floes, and many were the cold dippings we got for their sake. On the 14th we sighted Balleny Island, and found it, according to Ross, in lat. 66° 44', long. 164° E. Several seals were shot there during the day. The ice-floes grew gradually larger as we approached the land, and it was evident that the ice-packs now around us were for a great part discharged from the glaciers of Balleny Island, some of the floes carrying stone and earth with them. Although the higher part of Balleny Island was covered in mist, when we were near it we got a good view of its lofty peaks, which rise to a height of 12,000 feet above the sea-level. The size and shape of the ice-packs about Balleny Island offered considerable danger to our vessel, and many anxious hours did we spend there. Covered with several yards of deep snow on the comparatively small surface above water, and running out into long sharp points under water, in our battle with the elements they were to us monitors of a most destructive kind. Several of them struck our propeller without injuring it seriously, but it is not likely that a vessel depending entirely on its sails would have been able to exist long in such ice, and even with steam we felt how small and powerless we were in its merciless grasp.

The temperature at Balleny Island was found to be—in the air, 34°; water, 28°. Finding the packs so impenetrable at this locality, we resolved to seek eastwards to the track where the *Erebus* and *Terror* had been navigated so successfully. On December 16 we moored the *Antarctic* to a large floe of pancake ice, which told its tale about the previous long calm. As far as our eye could reach, nothing but one immense field of ice could be seen. During the afternoon an increasing swell made our position unsafe, the huge ice masses rising and falling with long slow movements, and the sudden shocks that the side of our vessel received causing her to tremble from keel to crow's nest. On December 22, in lat. 66° 3′, long. 157° 37′ E., barometer at 29 inches, I shot a wonderful seal, of ordinary size and colour, but without any signs of ears, and with a very thick neck. Not one of our experienced hands on board had ever seen this kind before, and I regret to say that the skull, which I had prepared, was accidentally crushed.

On December 24, in lat. 66° 3′, long. 167° 37′ E., there was stormy weather. The evening, however, was beautiful, and the sun just touched the horizon on its lowest descent. I believe that we are the only people who ever saw the midnight sun at Christmas Eve. On Wednesday (26th) we crossed the Antarctic circle. On the 28th our chief engineer, Mr. Johanson, had the misfortune to break one of his legs and seriously damage his hand. He was, however, fixed up as well as possible by the poor medical skill at hand; and I am very glad to say that he at present is getting on all right. New Year's Eve we were in lat. 66° 47′, long. 174° 8′ E., at 12 o'clock. While the sun was shining bright, we rang the old year out and the new year in, and saluted with our guns in honour of the occasion. In lat. 67° 5′, long. 175° 46′ E., I secured a specimen of *Aptenodytes Forsterii*, a large penguin. On the 14th, in lat. 69° 55′ S., long. 177° 50′ E., we came again into open water, having spent thirty-eight days in working our passage through the pack-ice. A clear open space of water was now before us, and not a breath of wind disturbed the surface of the sea. The only sign of ice was a small piece in the shape of a boat, on which four penguins leisurely appeared to be rejoicing like ourselves in the splendid weather and beautifully clear skies.

We steered straight for Cape Adare, on Victoria Land, which we sighted on January 16. On the 18th, in lat. 71° 45′, long. 170° 18′ E., the temperature of the air was 32°, and of the water 30°; the sky was completely clear. At noon we stood towards a bay to the north-west of Cape Adare. The cape, which was in 71° 23′ and 169° 56′ E., rises to a height of 3779 feet, and consists of a large square basaltic rock, with perpendicular sides. From there we saw the coast of Victoria Land to the west and south as far as the eye could reach. It rose from dark, bare rocks into peaks of perpetual ice and snow, 12,000 feet above the level of the sea, Mount Sabine above the rest standing out shining in the rays of the midnight sun. Conical tops covered the plateaux and ran over in mighty glaciers. I counted as many as twenty glaciers in the close vicinity of the bay at Cape Adare. One of them seemed covered with lava, while a thick layer of snow appeared underneath resting on another layer of lava, and that again on the billowy surface of the glacier. A volcanic peak about 8000 feet high, which was comparatively free from snow, had undoubtedly been in activity a short time ago.

At noon of the 18th we sighted Possession Island, with its peculiar contours standing sharply against the bright sky. We effected a successful landing on the North Island, pulling our boat up on the shore, and were at once furiously attacked by the penguins, which covered the very ground of the island in myriads, and seemed much annoyed by seeing us intruding on their premises. Their hoarse screams filled the air, and it was with considerable strain of my voice that, on landing, I addressed my countrymen in a few words, informing them that we were the second party to set foot on this island. Sir James Ross had preceded us, having fifty-four years ago landed here and planted the English flag. We gave three cheers for that great British navigator, and also for Captain Svend Foyn, who so bravely sent out this present Antarctic expedition.

The penguins had half-grown young ones, and were often attacked by a grey lestris, which sailed about in large numbers. So bold was this bird that several times I had to use my stick in self-defence. The ground on the island was covered with a deep layer of guano, which in time might prove valuable to Australia. I have brought a sample of it to be analytically tested. The island consists of volcanic vesicular lava, rising in the south-west in pointed peaks of 3000 feet in height. To the west it slopes gently upwards, forming a bald and conspicuous cape, which cape, not being named by Sir James Ross, was left to me to christen. I gave it the name of Sir Ferdinand von Mueller. I quite unexpectedly found vegetation on the rocks, about 30 feet above the sea-level, and I think vegetation never was found before in so southerly latitudes. I have reason to believe that this cellular and cryptogamous plant is a lichen.

Possession Island situate in lat. 71° 56′, long. 171° 10′ E., was remarkably free from snow. I judged this island of the group to be 300 to 350 acres in size. We gave it the name of Sir James Ross Island. On the 20th we steamed southward, and sighted Coulman Island on the 21st at midnight. Finding the eastern cape of this large island unnamed, we called it Cape Oscar, in honour of his Majesty our king, whose birthday it happened to be that day. Off Coulman Island we found great irregularities in our compasses, and doubtless that island contains secrets of scientific value. On the 22nd we were in 74° south. No whales appearing, it was decided to head northwards again, although we all regretted that circumstances did not permit us to proceed further south. On the 23rd we were again at Cape Adare, and successfully effected a landing, being the first human creatures who ever put foot on the mainland. Our landing-place was a sort of peninsula or landslip, gently sloping down from the steep rocks of Cape Adare until it ran into the bay as a long flat beach, covered with pebbles. This peninsula forms a complete breakwater for the inner bay. The penguins were, if possible, even more numerous here than on the Possession Islands, and they were discovered on the very cape, as far up as 1000 feet. These birds seem to lead a strange sort of life. They must often live for days without food, for it must necessarily take them two or three days to reach up to the height of 1000 feet up on the rocks, where some of them were nested, and as the *Argonauta antarctica* and fish form their food, it is evident that these birds in some way can store away food for days.

Having collected specimens of rocks, and found the same cryptogamic vegetation here as on the Possession Islands, we again pulled on board, considerable difficulty being experienced in regaining our vessel through some heavy drifts having come between us. We now stood northwards, and on the 26th, in lat. 69° 52′, long. 169° 56′ E., we again ran into the pack-ice. The following day we shot fast in a small finned whale, whose flesh makes an excellent dish. On February 1, in lat. 66°, long. 172° 31 E., we ran into open water again, having this time only spent six days in the pack-ice. On the 17th the Aurora appeared, stronger than I ever saw the Aurora in the north. It rose from south-west, stretching in a broad stream up towards the zenith, and down again towards the eastern horizon. The phenomenon had this time quite a different appearance from that we saw on October 20. It presented now long shining curtains rising and falling in wonderful shapes and shades, sometimes seemingly close down to our mast-heads, and it evidently exerted considerable influence upon the magnetic needle in our compass.

In lat. 44° 35′ and long. 147° 34′ E. we met with a great number of sperm whales. We hunted them in our boats, and secured one. After struggling for several days with a furious storm of distinctly cyclonic character, we sighted the coast of Tasmania on March 4, and entered Port Phillip Heads on the 12th, five months and a half after our departure from Melbourne.

THE ELEVENTH GERMAN GEOGRAPHICAL CONGRESS.

THE Deutsche Geographentag, or Congress of German geographers, was originated in 1881 at Berlin, and until 1887 it met annually, the places of meeting being Halle, Frankfurt-am-Main, Munich, Hamburg, Dresden, and Karlsruhe. Since then the meetings have taken place once in two years, in Berlin, Vienna, Stuttgart, and this year at Bremen. The objects of the Geographentag are given by Dr. W. Wolkenhauer in an article in a local newspaper, as (1) to give expression to the present position of geographical knowledge and effort; (2) to give fresh stimulus to geographical studies; (3) to thereby exert a deepening and widening influence on geographical education; and (4) to promote intercourse between geographers, and afford an opportunity for the growth of personal friendships. The objects are thus in the main educational and social; and the German meetings are distinguished from the annual gatherings of travellers at Section E of the British Association, and the annual reunion of geographical societies in France, by the preponderance of the University and educational element. The average attendance at each Geographentag is about 500.

The Free and Hanse town of Bremen, at which the eleventh meeting was held, from April 17 to 19 this year, is itself of great geographical interest. It is a municipal republic within an empire, a seaport and commercial town of European importance, combining the memory of the past in its ancient buildings with the highest achievements of the present in harbour-engineering and electric traction; and its ancient ramparts, converted into a ring of stately public gardens, intersect the town, giving it a variety which could never be anticipated from the flatness of its site. The meeting was combined with a gathering of German meteorologists, and it occurred at the proper time to celebrate the twenty-fifth anniversary of the Bremen Geographical Society. This society, so favourably known amongst geographers on account of its admirable journal, *Deutsche Geographische Blätter*, was the outcome of the interest in Arctic exploration which has always been strong in Bremen, and Polar discovery has occupied a prominent place in its proceedings from the beginning. It was, therefore, peculiarly appropriate that the first business before the Geographentag on Wednesday morning was a paper on "Antarctic Discovery" by the veteran Dr. Neumayer.

In his address, Dr. Neumayer gave a short account of the expeditions which have taken place to high southern latitudes; and he dwelt particularly on the fact that the theories of Gauss with regard to terrestrial magnetism had afforded the needed stimulus to Antarctic research in the fourth decade of the century. It is impossible that the wider scientific conceptions of the present day can fail to make a renewal of Antarctic exploration profitable to the highest good of the civilized world. How strongly he feels on this subject, Dr. Neumayer said, can be gauged from the fact that he has urged the importance of renewing Antarctic work unweariedly—at Berlin in 1886; at Heidelberg in 1889; at Bremen in 1890; at Nuremberg in 1893; at Vienna in 1894. The main scientific importance of such investigations will lie in the fields of meteorology, geodesy, and magnetism; and the full discussion of the subject being arranged for at the Sixth International Geographical Congress between the geographers of all nations may be hoped to lead to some result. One of the first essentials for discussion is the preparation of a large-scale map showing all information up to date. Herr von Haardt zu Hartentum had compiled the map required, which was exhibited in the hall. Dr. Neumayer concluded with an appeal to German geographers and men of science to support him in his efforts to promote south polar discovery.

Dr. E. von Drygalski followed with a paper on "South Polar Discovery and the Ice-problem." Relying on his experience of three years in Greenland studying the various forms of Arctic ice, he explains how the arrangement of the crystals in the mass of ice varied with its origin: in sea-ice the principal axes of the crystals are parallel to the freezing surface, in fresh-water ice the axes are perpendicular to the surface, and in glacier-ice they have no particular orientation. As to an Antarctic expedition, he believed that to send out two ships meant to send out two separate expeditions, and that one vessel could produce very valuable results. Dr. Vanhöffen, of Kiel, read a short paper on the zoological and botanical bearings of south polar research, and in the general discussion which followed, Herr Friedrichsen, of Hamburg, mentioned the efforts made by the Royal Geographical Society to promote a British expedition, and stated that a Belgian merchant had promised £12,000 for a Belgian expedition. He also announced that a German expedition was being planned at an estimated cost of £10,000 for one year's work in one ship, and said that the *Jason* would be available in September this year. Professor Neumayer, in answer to a suggestion that scientific exploration might be combined with seal or whale hunting, declared emphatically that such a combination was absolutely fatal to success in scientific work. Confidence was expressed that the money would be forthcoming, and that an expedition would be sent out.

The afternoon sitting on Wednesday was devoted to school geography, Dr. Lehmann commencing by a paper on the "Educational Value of Geography." He insisted more particularly on the educational value of geography as explaining the causal relations of isolated facts. There was an animated discussion. Dr. A. Oppel, of Bremen, gave a dissertation on the use of pictures in geographical teaching, but it is curious to notice that, while recommending the use of wall-pictures and discussing the relative merits of etchings, engravings, oil-colours, and water-colours, he said nothing of photographs or lantern-slides. Dr. Rohrbach, of Berlin, urged that an agreement should be come to by the producers of educational maps, to extend Mercator's projection to the same latitude south and north. In the conjoined meteorological meeting Dr. Berson gave a valuable paper on scientific ballooning, and Professor Hellmann on the yearly periods of storms in Europe.

On Thursday morning Count Götzen gave a graphic account of his recent journey across Africa.* Dr. Hermann Wagner read a paper on the "History of Cartography," with special reference to the series of historical charts shown in the exhibition. He dwelt chiefly on the early compass-maps of the Mediterranean, showing how they distorted the axis of that sea, and how they prepared the way for the use of Mercator's projection. He also treated very fully of the scales employed, especially the value of the sea-mile.

Professor Krümmel, of Kiel, presented a valuable discussion of the utilization of observations made on the war-vessels and merchant ships of all nations for oceanographical purposes. The ship's Journals containing these observations, which are purely voluntary, are sent in to a central authority in each country—the

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* See p. 354 of this volume.

Deutsche Seewarte in Hamburg for Germany, the Meteorological Office in London —and since the enormous strides in the practical applications of such data made by Maury in the United States, the governments of most maritime countries have issued charts of winds, temperature, currents, etc. He pointed out a startling discrepancy between the willingness of German and British captains to undertake oceanographical observations at sea. In the Deutsche Seewarte 7990 full ships' Journals were accumulated by the end of 1894 against 6000 in the British Meteorological Office, and 425 are received yearly in Hamburg as compared with 175 in London. Add to this the fact that 20,000 British ships are at sea for 3500 German vessels, and it appears that in the last twenty-five years the German sea-captains have been twelve times as active in oceanographical work as the British. Professor Krümmel stated that oceanography had been claimed as a peculiarly English branch of science, and complained that in England non-British work is ignored. An admirable feature of the Deutsche Seewarte is the opportunity it gives to young scientific men fresh from the University to pursue special researches with the material accumulated in its archives. Several important oceanographical memoirs have recently been published in this way. Professor Börgen, of Wilhelmshafen, communicated a paper on the "Tides."

In the afternoon the meeting took the form of an excursion in Bremen, visiting the Cotton Exchange, the historic Rathaus (the upper hall of which contains fine models of ancient Hanseatic trading ships), a tobacco warehouse, and a rice-mill, typical of the principal industries of the town. The warehouses of the North German Lloyd steamers were also shown to the excursionists, and the afternoon concluded with a trip on a special steamer from the Free Harbour.

On Friday the last meetings of the Geographentag took place, when Herr Bücking, of Bremen, described the engineering works undertaken for the improvement of the river Weser from Bremen to the sea. Dr. B. Tacke spoke of the economic importance of the moors of North-West Germany, a subject rendered the more interesting by the fact that an excursion had been arranged to visit Wörpedorf, where one of the most flourishing moor-farms is found. Professor Buchenau, of Bremen, concluded by describing the East Frisian Islands and their flora. The reports of several committees were presented.

An admirably arranged exhibition was displayed in the rooms of the Kunstler Verein, where the Geographentag meetings were also held. While some of the subjects, such as models of ships and of buoys, were only of incidental geographical interest, the remaining exhibits were of great value. We have only space to give in outline the divisions in which the exhibits were arranged. The first chief group was divided into (1) nautical exhibits comprising models and instruments; (2) Professor Wagner's historical collection of sea-charts, from the thirteenth to the eighteenth century, specially illustrating the acceptance of Mercator's projection, and of the minute of latitude as the sea-mile; (3) an exhibit by the Deutsche Seewarte of works on maritime meteorology and oceanography, in which, however, the records of British and American expeditions were not included; (4) Herr Dietrich Reimer's exhibit of the German official charts and sailing directions; (5) old maps of the Weser; and (6) models and plans of the Weser and its various harbour-works. In the last section a very striking feature was the model of the Weser from Bremen to Jungfernbake on the scale of 1: 10,000. The second chief group consisted of literary and artistic geographical works, including maps, globes, and pictures. Its subdivisions were (1) the exhibit of Dietrich Reimer (Hoefer and Vohsen), Berlin; (2) that of Justus Perthes, Gotha; (3) maps and atlases by different exhibitors, arranged systematically as (*a*) school wall-maps; (*b*) large-scale maps of high precision; (*c*) maps for practical use; (*d*) school atlases; (4)

geographical books classified according to subject; (5) apparatus for geographical work; and (6) geographical pictures and photographs. The third chief group was the regional geography of Bremen and the lower Weser, including (1) a historical series of plans of Bremen; (2) pictures of Bremen, and eleven other subdivisions. The total number of exhibits was 1575, and the catalogue was very full and clearly arranged.

On an English visitor the impression made by this meeting of geographers was that in the "intensive" geographical research of the present day the chief success must attend the nation which gives the highest place to geographical education, just as surely as the foremost position in the wider exploration of the globe inevitably fell to the country which threw itself most heartily into foreign trade and distant adventure.

The social aspects of the meeting were of the pleasantest; there was cordial hospitality without restraint, and the foreign visitors, at least, will never forget the banquet, with its gift of priceless wine from the municipal cellars, the enthusiastic informal evening in the Rathskellar, and the princely liberality of the North German Lloyd Company on board their steamer *Habsburg*, which carried a large party of geographers from Bremerhafen to Heligoland.

THE MONTHLY RECORD.

THE SOCIETY.

Royal Medals and other Awards for 1895.—The Royal Medals for this year for the encouragement of geographical science and discovery have been awarded as follows: The Founders' Medal to Dr. John Murray for his services to physical geography, and especially to oceanography during the last twenty-three years; for his work on board the *Challenger*, and as Director of the *Challenger* Commission, and Editor of the *Challenger* Publications. The Patron's or Victoria Medal to the Hon. George N. Curzon, M.P., for his travels and researches in Persia, in French-Indo China, in the Hindu Kush and Pamirs, and his investigation of the source of the Oxus. The Murchison Grant has been awarded to Mr. Eivind Astrup for his journeys with Lieut. Peary across Greenland, and his journey along the shores of Melville Bay; the Back Grant to Captain C. A. Larsen for his Antarctic voyage in 1894; the Gill Memorial to Captain J. W. Pringle, R.E., for his work in connection with the Railway Survey operations in British East Africa; the Cuthbert Peek Grant to Mr. G. F. Scott Elliot for his exploration of Mount Ruwenzori and the neighbouring region. The three honorary corresponding members chosen are—Senhor Luciano Cordeiro, Secretary of the Lisbon Geographical Society; Professor J. K. F. Steenstrup, Danish geologist and explorer of Greenland; and Professor E. Levasseur, Professor of Geography in the Collége de France, Paris, and President of the Paris Commercial Geographical Society.

The Sixth International Geographical Congress.—The preparations for the Congress are progressing rapidly. Increased accommodation for the Exhibition has been secured at the Imperial Institute, and the organization of different departments of the Exhibition has been undertaken by competent authorities. Mr. Ravenstein is preparing the historical collection of maps, which will include some entirely novel features; Mr. John Coles has practically completed arrangements for a very representative selection of geographical instruments and travellers' equipments; and Mr. John Thomson is preparing a collection of portraits of geographers and views of scenery. The Geographical Societies of Berlin, Paris, and St. Petersburg are co-operating in the heartiest manner, and the promises of membership from the Continent are most encouraging. There is every reason to believe that the London meeting will be one of the most impartially international gatherings in the history of the Congress. The Fellows of the Royal Geographical Society have taken upon themselves the responsibilities of receiving their foreign friends worthily, the sum subscribed or promised by them and by other generous members of the public and public bodies now amounting to over £2500. Offers of personal hospitality to foreign members are being daily received by the secretaries. London will not be alone in welcoming the geographers of the world. Receptions to a number of the delegates and foreign members are being arranged by the Geographical Societies of Manchester and Liverpool; while excursions will also be made to Edinburgh, Newcastle, to the university towns of England, and many other places of interest. A circular will be issued before the end of May to all whose names have been sent in to the secretaries, and copies will be forwarded free on application to any one who applies for them. This circular will give full particulars as to the arrangements which have been concluded, and will be followed at an early date by a provisional programme of the meeting. From the Washington Letter in the last number of the *Bulletin* of the American Geographical Society, it appears that at a meeting of the new federation of scientific societies in Washington (including the National Geographic, the Anthropological, Biological, Chemical, Entomological, Geologic, and Philosophical Societies), action was taken with the view of inviting the Congress to hold its next meeting in Washington. Any persons wishing to propose resolutions with regard to international work in geography, with reference to geographical definitions or any similar matter, are requested to give immediate notice in writing to the secretaries of the Congress at the Royal Geographical Society, 1, Savile Row, London, W., to whom all inquiries may be addressed. As there are many and increasing demands on the time of the secretaries, it is hoped that information may be applied for by letter, except when a personal interview is really necessary.

ASIA.

Formosa.—Under the new *régime* initiated by the recent treaty between China and Japan, our knowledge of the island of Formosa may be expected before long to become considerably extended. Inhabited in great part by uncivilized aboriginal tribes, about which our information is still very imperfect, it is only in the western part, colonized within the last two hundred and fifty years by the Chinese, that journeys have been made by Europeans into the interior. Early in the seventeenth century the Dutch established themselves on the island, and to them we owe one of the earliest accounts of it, written by the pastor, G. Candidius, in 1637, and subsequently published in English in the first volume of Churchill's collection of voyages. The Jesuits collected information with regard to the island, about which Klaproth also wrote, while in modern times various descriptive accounts have been given in the publications of the R.G.S. and elsewhere. Of the papers which have appeared in this country, we may mention those by R. Swinhoe (*Journal* R.G.S., vol. xxxiv.), J. Thomson (*Id.*, vol. xliii.), J. Morrison (*Geographical Magazine,* October, November, and December, 1877), M. Beazeley (*Proceedings* R.G.S., January, 1885), G. Taylor (*Id.*, April, 1889), Professor de Lacouperie (J.R.A.S., vol. xix. part 3, 1887), A. R. Colquhoun (*Scottish Geogr. Mag.*, 1877), besides various Foreign Office Consular Reports, of which that by Mr. Hosie (Commercial, No. 11, 1893), dealing with its resources and trade, is of special value. During the cruise of the *Marchesa*, Dr. Guillemard visited the eastern and northern coasts, making a short excursion into one of the openings in the magnificent precipices of the former, and he devotes the opening chapter in his book to an account of his visit. The island was included within the sphere of operations of the Jesuit survey of China, and a map was published by D'Anville in Duhalde's account of that country. The coasts have been surveyed by the British Admiralty, but, with the exception of sketch maps illustrating the papers above mentioned, there are few dealing with the interior. The positions of the principal towns and villages may, however, be seen on a map published at Shanghai, in 1894, by R. A. de Villard, but in this many of the names are given only in Chinese characters. The northern extremity was surveyed and drawn on a large scale by J. W. Patersson, of the Chinese Customs Service, in 1882.

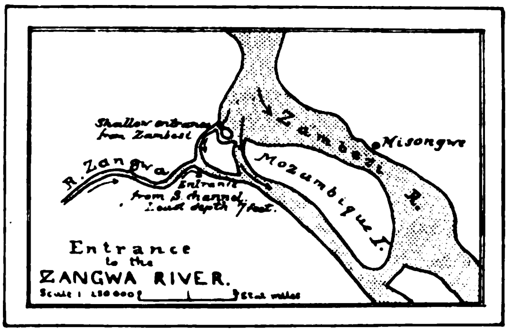
Dr. Waddell's Researches on Lamaism.—In the introduction to his newly published book, 'The Buddhism of Tibet,' Surgeon-Major L. Austine Waddell gives a short account of his preparations for the study of the religion of Tibet, which strikingly illustrates the possibilities of exploration in that little-known land. It may be argued that a study in comparative religion lies beyond the scope of a geographical journal; but we hold that geography is concerned with the elucidation of all departments of knowledge in countries that remain for the most part unknown, for the same reason that geography is to be advanced by the utilization of the results of all sciences tending to explain the relation between land and people in countries that have been fully studied. The following extract from the preface of Dr. Waddell's book shows how, after studying Buddhism in Burma, Ceylon, Sikkhim, Bhotan, and Japan, he pursued his investigations in the borderland of Tibet: "On commencing my inquiry I found it necessary to learn the language, which is peculiarly difficult, and known to very few Europeans. And afterwards, realizing the rigid secrecy maintained by the Lamas in regard to their seemingly chaotic rites and symbolism, I felt compelled to purchase a Lamaist temple with its fittings; and prevailed on the officiating priests to explain to me in full detail the symbolism and the rites as they proceeded. Perceiving how much I was interested, the Lamas were so obliging as to interpret in my favour a prophetic account which exists in their scriptures regarding a Buddhist incarnation in the West. They convinced themselves that I was a reflex of the Western Buddha, Amitābha, and thus they overcame their conscientious scruples, and imparted information freely. With the knowledge thus gained, I visited other temples and monasteries critically, amplifying my information, and engaging a small staff of

Lamas in the work of copying manuscripts, and searching for texts bearing upon my researches. Enjoying in these ways special facilities for penetrating the reserve of Tibetan ritual, and obtaining direct from Lhasa and Tashi-Chunpo most of the objects and explanatory material needed, I have elicited much information on Lāmaist theory and practice which is altogether new."

AFRICA.

Kilimanjaro.—At the meeting of the Berlin Geographical Society on March 2, 1895, Dr. Volkens gave an account of his botanical researches on Kilimanjaro. The most important section, from a geographical point of view, referred to the exploration of the districts between 7000 and 13,000 feet above sea-level, which recent accounts have described as being of wonderful grandeur, the north-western parts especially abounding in profound ravines, perpendicular cliffs, waterfalls, and all the imposing scenery of a mountain world. Hitherto maps have shown the Shira mountains as a number of chains radiating towards south and south-west, and rising to a maximum height of about 13,000 feet. Seen from the plain, they give the impression of a single range. Meyer's otherwise excellent map requires correction, inasmuch as the glacier extending down Kibo from the upper edge of the crater does not exist; its existence is, indeed, impossible, for all the middle third of the summit is a vertical precipice. The survey of the whole region has shown that the southern and eastern districts are not, as had been supposed, the most valuable. At Muika and Masaki, for example, the rock is chiefly tufa, and the soil consequently less fertile than where it is formed from decomposed lavas. Further, during the long rainy season most of the rain-bearing clouds come from west and south-west, and the supposed brooks and streamlets from the Kibo glacier do not exist. The Mawenzi is dry by the beginning of October, and nearly free of snow from autumn to spring. In Useri and the Rombo districts the Wachagga have sometimes no water-supply for weeks together, except what they obtain by squeezing banana stems, although the mere fact of extensive banana cultivation indicates ground water near the surface. The Wachagga population of Kilimanjaro may be estimated at 60,000 to 80,000, and the government is distributed amongst thirty-six chiefs. Each chief usually rules over an isolated slice of land stretching up to the mountains, and bordered on each side by ravines; but in Rombo, beyond the Lumi, the territories are more broadly extended, and form a kind of union amongst themselves. There are no villages; the natives live in conical-shaped huts, each family building a separate establishment in the banana shamba to accommodate themselves and their live stock. The huts of the chiefs are larger than the others, and are usually placed in a kind of farmyard enclosed by a stone wall. The Bomas of Sina and Kinabo, chiefs of Kibosho and Rombo Mku, are of so complicated a plan as to be practically impregnable to natives. The Wachagga are divided into five castes—the chiefs, their children, the Akides or councillors, the free men, and the slaves. Slaves are either house slaves or chiefs' slaves; the former are women and children taken prisoners in war (grown-up men are always killed), and are allotted by the chief to his subjects according to services rendered, subject to the conditions that they cannot be sold without his consent, and that he receives a commission if his consent is obtained. Chiefs' slaves are natives whose creditors have been empowered by a public meeting to sell them, or minors who have been convicted of crime, and whose relatives refuse to pay expiation money. In both cases chiefs' slaves may regain freedom when their earnings amount to the sum involved, but the position of slave offers opportunities of dealing with the master's property which make purchase of freedom rare. Only Sina of Kibosho is an absolute monarch; all the other chiefs must take counsel of the Akides and of the Askaris, the latter bodyguard consisting of the chief's youthful companions. Succession usually goes to the eldest son, but in special cases the chief and tho Akides may agree to set aside this rule. The chief and his councillors sit as a court of justice in a public shauri, and in complicated cases the trial by ordeal is resorted to. Amongst the wealthier classes this consists of the Kimangano, a draught of strongly narcotic but not poisonous effect. In the Lingana a corner of the mouth is pierced, and guilt detected by the effusion of blood; the result evidently remaining very much in the hands of the medicine-man who operates. Polygamy is not prohibited, but the price of wives is so high that monogamy is general. Divorce is obtained by returning the purchase-money: adultery is severely punished, under certain circumstances by death. Husband and wife are after death buried at the right-hand side of the entrance to their huts, where the cattle are kept; the bodies are buried naked, the man resting on his right side and the woman on her left. After a year the skulls are exhumed and placed in a clay jar embedded in the banana shamba, so that the mouth, covered with a potsherd, projects above ground. The firstborn son of the chief wife is sole heir, failing whom the property is equally divided amongst all the children.

The Zangwe River, Zambezi Basin.—Mr. W. G. Anderson, a missionary on the Lower Zambesi, has forwarded us an account of his recent examination of the mouth of the Zangwe or Zangwa river, which joins the Zambezi on the south bank, a little below the mouth of the Shire. His interest in the river was aroused by the idea that it might supply a water communication between the port of Beira and the Zambezi, and thus prove useful in the not improbable event of the silting up of the Chinde mouth of the latter river. The country between the Pungwe and the Zambezi is in parts exceedingly flat, and an interlacing of the tributary streams has for some years been shown on our maps. The first attempt to enter the Zangwe (or Zangwa in the local pronunciation, according to Mr. Anderson), made a little above the upper end of Mozambique Island, in a boat drawing 16 inches, was frustrated owing to the extreme shallowness of the water. On a return to the district, however, another channel was discovered, which on examination proved to communicate with the Zangwe, the passage being nearly closed by high reeds, from behind which a quantity of inky-black water slowly flowed to the Zambezi. The river above was about 50 yards wide, with banks from 5 to 10 feet high, the depth averaging from 17 to 20 feet. Progress was finally stopped by an impenetrable barrier of vegetation, but beneath this the depth was found to be still 18 feet. The natives asserted that there was a deep channel the whole way to the Pungwe, and Mr. Anderson considers that the


Shallow entrance from Zambesi
Zambezi R.
Nisongwe
R. Zangwa
Mozambique I.
Entrance from S. channel. Least depth 7 feet.
Entrance to the ZANGWA RIVER.
Stat. miles

obstruction could easily be removed. In times of flood, water is said to flow from the Zambezi into the Pungwe. The branch which forms a permanent connection, and which is named Urema on our maps, is properly, Mr. Anderson says, called Ndinge Ndinge. Dr. Livingstone's visit to the district appears still to be remembered among the natives.

Physical Features and Geology of Mauritius.—At the meeting of the Geological Society on April 3, a communication was read on the "Physical Features and Geology of Mauritius," by Major H. de Haga Haig, in which he said that the greater part of the surface of the island is composed of a volcanic breccia, with here and there lava-streams exposed in ravines, and sometimes on the surface. The commonest lavas are dolerites. In at least two places, sedimentary rocks are found at considerable elevations. In the Black River mountains, at a height of about 1200 feet, there is a clay-slate; and near Midlands, in the Grand Port group of mountains, a chloritic schist occurs about 1700 feet above the sea, forming the hill of La Selle. This schist is much contorted, but seems to have a general dip to the south or south-east. Evidence of recent elevation of the island is furnished by masses of coral-reef and beach coral rock standing at heights of 40 feet above sea-level in the south, 12 feet in the north, and 7 feet on the islands situated on the bank extending to the north-east. Major Haig gave full details of the physical geography of the island, including the nature and composition of the mountain ranges, the depth of the ravines, the occurrence of caverns in the lavas, and the character of the surrounding coral-reef; he also furnished information concerning the neighbouring islands, and referred to the possible former existence of an extensive tract of land at no great distance from Mauritius.

Dr. O. Baumann—Expedition to Zanzibar.—It is announced in the April number of *Petermann's Mitteilungen* that Dr. Baumann has been commissioned by the Leipsig Geographical Society to carry out a scientific exploration of the islands of Zanzibar, Pemba, and Mafia. Even the first named has never been fully mapped, while in the other two less still has been done in that direction, apart from the coast surveys of the British Admiralty, no travellers having spent a sufficient time on the islands to allow of an exhaustive study of their physical features.

Slatin-Pasha's Escape from Captivity.—By the fortunate escape of Slatin-Bey (now Pasha), on which we heartily congratulate him, the number of European prisoners in the hands of the Khalifa has been still further reduced. As governor of Darfur before the Mahdist rebellion, Slatin had not the same opportunities of extending the bounds of geographical knowledge as his fellow-prisoner, Lupton-Bey, former governor of the Bahr-el-Ghazal Province (who, it will be remembered, was one of the first to succumb to the hardships of captivity), but the sympathies of geographers have been none the less with him during his long twelve years' detention. The only prisoners now remaining are a member of a Catholic sisterhood, and the German Neufeld, who rashly ventured into those regions after the disturbances began.

The Likoma Islands.—The Rev. Chauncy Maples has pointed out that in the map of the British Central Africa Protectorate, lithographed at Stanford's geographical establishment for the March number, the Likoma Islands are wrongly coloured; they should be marked as British, in accordance with Article IV. of the Agreement of June, 1893, and of Article V. of the Treaty of June 11, 1891.

POLAR REGIONS.

A Peary Relief Expedition.—The first number of the *Bulletin* of the American Geographical Society for the current year contains a series of documents relating to the proposed expedition to bring back Mr. Peary in August next. At the suggestion of Mrs. Peary, the President of the American Geographical Society wrote to the Secretary of the Navy at Washington, setting forth that Mr. Peary had made three important expeditions in northern Greenland at his own expense, spending about £12,000, thereby adding many new facts to our knowledge; and suggesting that a Government vessel should be sent to Melville Bay in August to ensure the return of himself and his two faithful companions. The Secretary of the Navy replied that it was impossible to take any action without special authority from Congress, and an appropriation to cover expenses. Mrs. Peary, aided by Mr. Emil Diebitsch, 2014, Twelfth Street, N.W., Washington, as business manager, has in consequence resolved to raise £2400—of which the American Geographical Society contributes £200—to equip a private expedition to start from Newfoundland about July 5. A limited number of scientific societies, educational institutions, or individuals contributing £200 to the funds will be entitled to nominate a representative on the expedition, subject to the approval of the scientific leader. Such representative must provide his own scientific outfit and pay his own expenses to St. John's, where he would embark. During the three months of the absence of the expedition opportunity for scientific work would be given in different parts of northern Greenland.

Arctic Ballooning.—M. S. A. Andrée communicated his project of a north polar expedition to the meeting of the Paris Academy of Sciences on April 29. He looks on the essentials of a balloon expedition as being the provision of a balloon sufficiently powerful to carry three persons with instruments, provisions for four months and ballast, the whole weighing about three tons, the balloon to be sufficiently impermeable in its texture to remain thirty days in the air, to be provided with arrangements for refilling in the polar regions, and to be to some extent capable of being guided. All these conditions, the author states, have been fulfilled in balloons which have been made and tested. The method of steering he favours is by means of a sail fitted with guide-ropes which drag along the ground, and prevent the balloon from being driven along at the full speed of the wind. The difference of velocity between the wind and the retarded balloon is utilized in steering, and on trial the plan succeeded in turning the balloon 27° from the wind, and in favourable cases even 40°. The object of the proposed expedition, which will start in the summer of 1896, is to make the most complete geographical exploration possible of the north polar area. The balloon will be filled on one of the islands at the north-west of Spitzbergen, and weighted so as to float about 900 feet above the ground. The continual daylight will permit of photographs of the whole route being taken. M. Andrée shows that many of the obstacles to arctic exploration by sea or over the ice offer no hindrance to a well-equipped balloon, and he draws attention to the fact that in a few days of favourable weather more may be done in the way of polar discovery than has been effected by previous centuries of effort.

Dr. Drygalski's Photographs of Greenland.—The extensive collection of photographs brought home by Dr. Drygalski have been exhibited at the Berlin Geographical Society, and some explanatory remarks are given in a recent number of the *Verhandlungen* (1895, No. 2). They include scenes illustrative of the life and occupations of the Greenlanders, types of scenery and vegetation, and in particular, pictures of glaciers and ice, which, as Dr. Drygalski says, really give the Polar Region its character, and the study of which helps also to the correct understanding of the land features. The division of the ice-formations of Greenland into two distinct types may be well discerned from an examination of the views. The *coast glaciers* resemble those of Europe, especially those of Norway, having their area of supply above the snow-line, but the course through the valleys being entirely below it. They carry down a great quantity of earthy matter, from the disintegration of the valley walls. The inland ice is of a totally different character, having no connection with the present surface features, but behaving like a viscid mass which has overflowed from a point in the interior. The photographs show the succession of stages from the uniform almost motionless expanse in the interior, through the region where the motion increases and the first cracks begin to appear, to the sudden drop to sea-level, and the sea-front whence the icebergs detach themselves. The increase in the rate of motion as the coast is approached forms one of the most important points of contrast with the coast glaciers. This important collection (which illustrates also minute points of ice-structure) should be most useful for the elucidation of ice-conditions in the Arctic Regions.

GENERAL.

Geography in Education.—At the Edinburgh Summer Meeting for educational lectures, to be held from August 5 to 31, we observe that geography receives ample recognition. Under the general head of the "Evolution of Cities," M. Elisée Reclus will deliver four lectures on "Belgium and its Inhabitants," Professor Geddes five lectures on "Britain," and Mr. A. J. Herbertson, the lecturer on geography at Owens College, Manchester, will give six lectures on "Edinburgh and its Province"—a course on regional geography which should stimulate the hearers, many of whom will be teachers, to obtain a firmer grasp of the principles of geography.

Medals of the Paris Geographical Society.—The award of medals for the year 1895 was announced at the meeting on March 1 as follows. The two gold medals of the Society are given to Lieut. Mizon and M. Emile Gautier for their explorations in West Africa and Madagascar respectively, while those founded by private individuals go to the following, the scene or subject of the work for which they are given being added in brackets: M. Foureau (Sahara), M. E. Ponel (French Congo), M. Th. Moureaux (magnetic map of France), Père Colin (Madagascar), M. A. Courtry (map of the Congo), M. Vidal de la Blache (general atlas), and M. Thoroddsen (Iceland).

Geographical Pictures.—Under the title of *Round the World*, Messrs. George Newnes have published a set of reproductions of photographs from all parts of the world at a remarkably low price. These pictures are in many cases thoroughly characteristic, and, being clearly printed, they should prove useful in the geography classes of elementary schools. The bird's-eye views of many towns are interesting in showing the nature of the site, and very often in suggesting the reason for the position of the town itself.

OBITUARY.

Professor J. D. Dana.

By Professor W. Morris Davis.

This eminent American geologist, an honorary corresponding member of the Society, of long standing, died on April 14. James Dwight Dana was born in Utica, New York, on February 12, 1813. He studied at Yale College, graduating in 1833, and taking a position as instructor in mathematics in the United States navy. From 1836 to 1838 he was assistant in chemistry at Yale under Silliman, and during this period he published his system of mineralogy. In 1838 he was appointed mineralogist, geologist, and zoologist to the United States exploring expedition under Captain Wilkes, and spent five years in the Antarctic and Pacific oceans. Soon after reaching Sydney, Australia, in 1839, Dana saw a brief newspaper notice of Darwin's then newly published theory with respect to the origin of atolls and barrier reefs. "The paragraph threw a flood of light over the subject, and called forth feelings of peculiar satisfaction and of gratefulness to Mr. Darwin, which still come up afresh," Dana wrote in 1872, "whenever the subject of coral islands is mentioned. The Gambier islands in the Paumotus, which gave Darwin the key to the theory, I had not seen; but on reaching the Feejees, six months later, in 1840, I found there similar facts on a still grander scale; . . . so that I was afterwards enabled to speak of his theory as established with much more positiveness than he himself, in his philosophic caution, had been ready to adopt." The control of the distribution of reef-building corals by the temperature of the sea-water in the coldest month was one of Dana's contributions to this subject; thus explaining the absence of corals from the Galapagos. The fiorded coasts of both South and North America led Dana to the view, then seldom if at all expressed, that fiords result from erosion followed by submergence; whether the erosion was done "by running water alone, or more or less by glaciers," must be determined by special examination.

On the return of the expedition in 1842, Dana was occupied for several years at New Haven and Washington in preparing his reports on zoöphytes, geology, and crustacea. In 1855 he succeeded Silliman, whose daughter he had married, receiving the professorship of natural history and geology at Yale; the title being afterwards changed to geology and mineralogy. Resigning the professorship in 1892, he devoted his time to the preparation of the fourth edition of his famous 'Manual of Geology,' which, from its first edition in 1863, has always held a first place among American text-books on this subject. The first edition of his 'Manual of Mineralogy' was issued in 1848, and its fourth edition in 1886; a later edition being prepared by his son, Edward S. Dana, Professor of Physics at Yale.

Although Dana seldom occupied himself with purely geographical questions, his writings and teaching were much concerned with the geographical distribution of geological formations, and with the origin of continents and of mountain ranges. He was the first to bring forward, in 1847, the doctrine of the comparative permanence of continents, which has found much confirmation in later years.

The wide recognition of Dana's scientific eminence is shown by his election to honorary membership in many foreign societies, while his beautiful personal character brought to him the affectionate veneration of all the geologists of his country. His death occurred suddenly on April 14, 1895.

Dr. P. J. Veth.

By Professor Dr. C. M. KAN.

The death has lately been announced of Professor P. J. Veth, the well-known Dutch geographer, who had since 1878 been one of the honorary corresponding members of the Royal Geographical Society.

Circumstances of life contributed to make of Professor Veth one of the most eminent and all-round savants of the Netherlands, while his own energy, accuracy, and critical faculty did the rest. Born at Dordrecht on December 2, 1814, Pieter Johannes Veth spent the first thirty years of his life in laying the foundation of the most diverse branches of knowledge, and in the second period he devoted his mental powers in particular to the study and interests of the Indian Archipelago.

In the last part of his life he extended the field of his geographical and ethnographical studies to other parts of the world. During the years of preparation, he attended the gymnasium of Dordrecht, where the learned principal, Dr. J. W. Grimm, introduced him to the classical and modern authors (including Shakespeare). At the University of Leiden he studied literature and theology, the Hebrew and Arabic languages (1832–38). Appointed Reader at the Royal Military Academy of Breda in 1838, it fell to him to teach English and Malayan, with the geography and ethnology of the Indian Archipelago. As Professor at the Athenæum of Franeker (1841) and that of Amsterdam (1843), he gave lectures on Oriental languages and philosophy.

So prepared, he applied the powers of his mind and the fruits of his wide and profound studies to the promotion and popularization of the knowledge of the Archipelago, not only on its scientific, but also on its social and economic side. As editor of the *Gids* (1843–1864), one of the best and most widely read periodicals in the Netherlands, and also of the *Tijdschrift voor Nederlandsch Indië* (Journal of the Dutch Indies), as director of the 'Bybel genootschap' (Bible society), and co-editor of the *Aardrijkskundig en Statistisch Woordenboek van Nederlandsch Indië* (Geographical and Statistical Gazetteer of the Dutch Indies, 1865–1869), he dealt with and solved many problems relating to the cultures, monetary and educational questions, philology, religion, history, geography, ethnology, and ethnography of the Malay Archipelago. During this period he wrote his 'Borneo's Wester-Afdeeling' (geographical, statistical, and historical description of the western part of Borneo), preceded by a description of the entire island (1854–1856), and published his monograph on the island of Timor (*Gids*, 1855). After his election as professor (1864) at the government school for the education of officers at Leiden, and at the University of that city (1877), he published a most important series of articles and works, of which we can mention here only his translation of Wallace's 'Malay Archipelago' ('Insulinde : het land van den Orang-oetang en den paradijs vogel,' Amsterdam, 1869–1871), a translation in which the original was enriched with many notes and corrections of high value; his 'Java, geographisch, ethnologisch, historisch' (Haarlem, 1873–1884), his *magnum opus* and the standard work on that important island, a *monumentum aere perennius* to its author, which gained the gold medal at the exhibition at the Paris Geographical Congress of 1875. In the third period (1873–1895) Professor Veth was chosen president by the founders of the Dutch Geographical Society (1873), and as that office obliged him to extend the field of his studies, and to take note of the scientific and practical aspects of geography which are of special importance to a nation with colonial and commercial interests, so in his turn he laid the Dutch society and geographical science in general under obligations to himself, by devoting all his powers, learning, and energy to a furtherance of the aims and projects of the Society, and the study of geography in those directions. Assigning to geography an intermediate place between science and practical affairs, he encouraged voyages and expeditions, especially to the colonies, taking care to point out their interest for commerce and industry, and publishing the results of Dutch research in every quarter of the world.

Naturally, the greater number and the best of his writings during this period are found in the *Journal* of the Dutch Geographical Society.* We can mention only the articles on the Javanese antiquities of the Dieng plateau; on Atjeh, Deli, and the east coast of Sumatra; his notes on the Key group, Timor, Flores, and South Celebes; and last, but not least, the publication of the reports by members of the expedition to the unknown interior of Sumatra ("Midden Sumatra. Reizen en Onderzoekingen der Sumatra expeditië," cf. R.G.S. *Proceedings*, i. p. 759). In the field of general geography, he published in the same *Journal* of the Dutch Geographical Society his studies on the progress of geography and geographical explorations, Dutch travellers in Africa (P. N. Muller and D. D. Veth), the South African Republic, Bibliography of Dutch works on Africa, Letters of P. J. van der Kellen on his journeys in Ambella, the life and voyages of Van de Putte in Asia, etc., etc. When Professor Veth celebrated his eightieth birthday (December 2, 1894), friends and pupils among his countrymen, and a great number of eminent savants from foreign countries, testified in a presentation Album their respect, gratitude, and affection for the venerable old man. Soon after they had to deplore his death, but consoled themselves with the thought that no long life could have been better used and ended. Until three or four days before his death he was engaged in studies connected with the second edition of his 'Java.' Death came peacefully, and took him to his well-earned rest.

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* An excellent bibliography of all the publications of Professor Veth relative to general geography, ethnology, history, religion, the geography of the Indian Archipelago, art, literature, languages, politics, etc., is to be found in the Album (Feestbundel) presented to Professor Veth by his friends and pupils on his eightieth birthday, compiled with great care by A. P. M. van Oordh and F. de Stoppelaur (Leiden : E. J. Brill, 1894).

Dr. David Lyall.

By Sir JOSEPH D. HOOKER, K.C.S.I., C.B., F.R.S.

Dr. David Lyall, R.N., F.L.S., Deputy Inspector of Hospitals and Fleets, one of the two last surviving officers of the Antarctic Expedition under Sir James Ross, died at Cheltenham in March last, in his seventy-eighth year. He was born at Auchinbrae, in Kincardineshire, and received his medical education at Aberdeen. After a short voyage to the Arctic seas in a Greenland whale-ship, he entered the Royal Navy, and was immediately appointed Assistant-Surgeon of H.M.S. *Terror*, Commander Crozier, the consort of the *Erebus*. To this duty Captain Ross added that of making botanical collections, in which Dr. Lyall distinguished himself, contributing largely to the botanical results of the expedition.

After some years of service in the Mediterranean Dr. Lyall received his promotion, and, on the recommendation of Sir W. Hooker, was appointed Surgeon and Naturalist to H.M.S. *Acheron*, commissioned to survey the coasts of New Zealand. On this voyage Dr. Lyall made admirable collections, especially in the harbours of the west coast of the southern islands, which had not been visited by any naturalist except Archibald Menzies during Vancouver's voyage in the beginning of the century. In 1852, Dr. Lyall was appointed Surgeon and Naturalist to the *Assistance*, one of the squadron sent out under the command of Sir E. Belcher in search of Sir John Franklin. In this service he received an acting order as lieutenant in command of a sledge-party employed in the search, and subsequently as Surgeon-Superintendent of the *North Star*, when the crews of the *Investigator*, *Resolute*, and *Intrepid*, and the invalids of the *Assistance* and *Pioneer*, retreated to that ship.

On his return he was appointed to the *Pembroke*, Captain Seymour, and served in her throughout the Baltic campaign of 1855, and was present at the bombardment of Sweaborg. This was followed by a short period of service on the Home Station, and this again by his being appointed Surgeon and Naturalist to H.M. surveying ship *Plumper*, and afterwards to the *Hecate*, under Captain (now Sir George) Richards, employed in the delimitation of the sea boundary between Great Britain and the United States. From the *Hecate* he was transferred to the

Land Boundary Commission under Col. Sir J. Hawkins, R.E. On this service Dr. Lyall formed a magnificent herbarium, of which an account was given to the Linnæan Society, accompanied with a sketch of the regions of vegetation crossed between the sea and summit of the Rocky Mountains in British Columbia.

Dr. Lyall's long and arduous services concluded with the appointments of Surgeon to Pembroke Dockyard, and subsequently to H.M.SS. *Trincomalee* and *Dædalus*, on the Home Station. He retired in 1873, and latterly resided at Cheltenham, where, shortly before his death, he met with an accident, the breaking of an arm, from the effects of which he never wholly recovered. He married, in 1866, Miss F. A. Rowe, of Haverfordwest, by whom he had three children.

MEETINGS OF THE ROYAL GEOGRAPHICAL SOCIETY, SESSION 1894–1895.

Eleventh Ordinary Meeting, May 13, 1895.—CLEMENTS R. MARKHAM, ESQ., C.B., F.R.S., President, in the Chair.

ELECTIONS.—*Edward Alfred Broome; Robt. Bonham Box Christie; Captain J. E. Clanson, R.E.; Alfred Deed; A. C. English; Robt. Montgomery Horne-Payne; Hon. H. G. Lyulph Howard; Alexander Weston Jarvis; Henry Richard Ladell, M.A.; J. T. Last; Eduardo Lembcke; John Martineau; Wm. E. Pickells; Major Clifford Probyn, M.C.C.; Major-General Lord William Seymour; Colonel Chas. Strahan, R.E. (Surveyor-General of India); Victor Streich; Julius Wernher.*

The Papers read were:—

1. "A Journey on the Upper Euphrates." By V. W. Yorke.
2. "Journeys in the Peninsula of Halicarnassus." By J. L. Myres.

GEOGRAPHICAL LITERATURE OF THE MONTH.

Additions to the Library.

By HUGH ROBERT MILL, D.Sc., *Librarian*, R.G.S.

THE following abbreviations of nouns and the adjectives derived from them are employed to indicate the source of articles from other publications. Geographical names are in each case written in full:—

A. = Academy, Academie, Akademie.
Ann. = Annals, Annales, Annalen.
B. = Bulletin, Bollettino, Boletim.
Com. = Commerce, Commercial.
C. R. = Comptes Rendus.
Erdk. = Erdkunde.
G. = Geography, Geographie, Geografia.
Ges. = Gesellschaft.
I. = Institute, Institution.
J. = Journal.
M. = Mitteilungen.
Mag. = Magazine.
P. = Proceedings.
R. = Royal.
Rev. = Review, Revue, Revista.
S. = Society, Société, Selskab.
Sitzb. = Sitzungsbericht.
T. = Transactions.
V. = Verein.
Verh. = Verhandlungen.
W. = Wissenschaft, and compounds.
Z. = Zeitschrift.

On account of the ambiguity of the words *octavo*, *quarto*, etc., the size of books in the list below is denoted by the length and breadth of the cover in inches to the nearest half-inch. The size of the *Journal* is 10 × 6½.

EUROPE.

Denmark. **Löffler.**

Dänemark, Eine landeskundliche Skizze von Dr. E. Löffler. Separat-Abdruck aus der "Zeitschrift für Schul-Geographie." XVI. Jahrg., V. u. VI. Heft, 1895. Size 9 × 6, pp. 20. *Presented by the Author.*

Denmark and Iceland. **Murray.**

A Handbook for Travellers in Denmark, with Schleswig and Holstein, and Iceland. Sixth Edition. London: John Murray, 1893. Size 7 × 4½, pp. x. [22] and 154. *Maps and Plans. Price 7s. 6d. Presented by the Publisher.*

Eastern Europe. **Bigelow.**

The Borderland of Czar and Kaiser. Notes from both sides of the Russian Frontier. By Poultney Bigelow. New York: Harper & Bros., 1895. Size 7½ × 5, pp. vi. and 344. *Illustrations. Presented by the Author.*

A pleasantly written and handsomely illustrated little book narrating incidents of travel in a Russophobist spirit.

England—Isle of Wight. **Ward.**

Thorough Guide Series. The Isle of Wight, with Notes for Geologists & Cyclists. By C. S. Ward. Eight Maps and Plans, by Bartholomew. London: Dulau & Co., 1895. Size 6½ × 4½, pp. x. and 86. *Price 2s. 6d. Presented by the Publishers.*

This guide is furnished with special geological information, and, although not contoured, the one-inch map of the island, which is included in sections, is very clear, and has been revised specially for the use of cyclists, the steep hills on the roads being noted.

England—Lake District. **Baddeley.**

Thorough Guide Series. The English Lake District. By M. J. B. Baddeley. With 15 Maps . . . by Bartholomew. Seventh Edition. London: Dulau & Co., 1895. Size 6½ × 4½, pp xxxii. and 254. *Price 5s. Presented by the Publishers.*

Well brought up to date.

France—Côte-d'Or. *Mém. A. Dijon* (4) 4 (1893–94): 255–275. **Collot.**

La formation du relief dans le département de la Côte-d'Or. Par M. L. Collot.

France—Seine-Inférieure. *B.S. Normande G.* **16** (1894): 85–109, 149–168. **Fallex.**

Le département de la Seine-Inférieure. Par M. Fallex. *With Maps and Diagram.*

Holland. *Tijd. Nederlandsch Aard. Genoots.* (2) **12** (1895): 51–70. **Winkel.**

De Taalkaart voor Noord-Nederland door J. te Winkel.

On a language-map of the Northern Netherlands.

Irish Channel—Tides. *Ann. Hydrographie* **22** (1894): 395–403. **Börgen.**

Die Gezeiten-Erscheinungen im Irischen Kanal. Bearbeitet von Admiralitätsrath Prof. Dr. Börgen. Aus dem im Druck befindlichen "Segelhandbuch der Südküste Islands und des Bristol-Kanals."

Russia—Harbours. *Ann. Hydrographie* **22** (1894): 319–334. ———

Beschreibung russischer Handelshäfen.

Descriptions of the harbours and trade of St. Petersburg, Reval, Pernau, Riga, Vindau, Libau, Odessa, Nikolayef, Yalta, Berdyansk, Mariupol, Taganrog, Novorossisk, Poti, Batum, and Archangel.

Russian Coast. *Ann. Hydrographie* **22** (1894): 283–295. **Spindler.**

Eisverhältnisse an den Seeküsten des russischen Reiches in den Jahren 1888 bis 1893. Nach J. Spindler.

Wales. **Baddeley and Ward.**

Thorough Guide Series, North Wales. Parts I. and II. (In one volume.) By M. J. B. Baddeley and C. S. Ward. (Part I.) Fifth Edition. (Part II.) Fourth Edition. London: Dulau & Co., 1895. Size 6½ × 4½, pp. (Part I.) xxiv. and 238; (Part II.) xvi. and 154. *Maps, Plans, and Panoramas. Price* (in one vol.) *5s. Presented by the Publishers.*

A revised and enlarged edition of this admirable guide. The maps are clear, but lack the pictorial effect of those in the "Scotland" and "English Lakes" of the same series.

ASIA.

Arabia. *Globus* **67** (1895): 165–170, 188–194, 207–211, 222–226, 234–237. **Nolde.**

Reise nach Innerarabien 1893. Von Baron Eduard Nolde. *With Portrait.*

This account of a journey from Damascus to Jof, and thence through the Nefud to Haiyannieh, is accompanied by a portrait of the author, whose tragic death in London occurred during its publication.

Central Asia. *Petermann's M.* 41 (1895): 87–92. **Hedin.**

Der kleine Kara-kul und Bassik-kul. Von Dr. Sven Hedin. *With Map.*

Chitral. *J.S. Arts* 43 (1895): 487–497. **Younghusband.**

Chitral and the States of the Hindu Kush. By Captain F. E. Younghusband. *With Map.*

Eastern Asia. **Schlegel and Cordier.**

T'oung pao. Archives pour servir à l'Étude de l'Histoire, des Langues, de la Géographie et de l'Ethnographie de l'Asie Orientale (Chine, Japon, Corée, Indo-Chine, Asie Centrale et Malaisie). Rédigées par MM. Gustave Schlegel et Henri Cordier. Extrait. Leyden: E. J. Brill, 1895. Size 10 × 6½, pp. 8.

Indo-China. **Lanessan.**

La Colonisation Française en Indo-Chine. Par J.-L. de Lanessan. Paris: F. Alcan, 1895. Size 7½ × 5, pp. viii. and 360. *Map.*

A sketch of the history of the French power in Indo-China, with special reference to the history of the French colonies since 1891.

Malay Peninsula. ——

The Kedah-Senggora or Malay Trans-Peninsular Railway. A concession granted by His Majesty the King of Siam to Charles Dunlop of Messrs. Powell & Co., Singapore. Size 9 × 6, pp. 24. *Presented by Messrs. Powell & Co.*

The railway here described is being constructed from Senggora on the Gulf of Siam to Alor Sta on the strait of Malacca, a distance of 76 miles, and thence south to Kulin, 60 miles farther.

Siberia. *J.S. Arts* 43 (1895): 499–507 **Wiggins.**

My recent voyages in Siberia. By Capt. Wiggins.

AFRICA.

Africa. **Vincent.**

Actual Africa; or, the Coming Continent. A tour of exploration. By Frank Vincent. New York: D. Appleton & Co., 1895. Size 9½ × 6½, pp. xxiv. and 542. *Map and Illustrations. Price 24s. Presented by the Author.*

Mr. Vincent has been a very extensive traveller, and is able to compare every country he visits with many others. The descriptions are obviously faithful. Mr. Vincent's views on geographical questions may be guessed at from the statement on the first page that the general configuration of Africa is not unlike that of South America, and on the last page, that, after travelling 355,000 miles in 25 years, he concluded the "Ten leading countries of the world, in the order of their novelty, variety, and degree of interest," to be Egypt, India, Japan, Turkestan, Persia, Morocco, Brazil, Mexico, Italy, and the United States.

Africa. **Keltie.**

The Partition of Africa. By J. Scott Keltie. With Twenty-four Maps. Second Edition. London: E. Stanford, 1895. Size 8½ × 6, pp. xvi. and 564. *Price* 16s. *Presented by the Publisher.*

The second edition of this work is seventy pages larger than the first, and, in addition to this enlargement, there has been a thorough revision of text and maps, carrying the history of the changeful continent on to the present year. The bibliography has been extended, and a statistical table of the partition of Africa in January, 1895, has been compiled by Mr. Ravenstein.

Africa—Disease-Distribution. **Felkin.**

On the Geographical Distribution of Tropical Diseases in Africa, with an Appendix on a new method of illustrating the geographical distribution of disease. By R. W. Felkin, M.D. *With Table and Map.* Edinburgh, W. F. Clay, 1895. Size 9 × 6, pp. 80. *Price* 3s. 6d. *Presented by the Publisher.*

Dr. Felkin is recognized as an authority on tropical diseases, and his long experience in tropical Africa fits him especially for a discussion such as this on the distribution of specific diseases in that continent, and the relation of ill-health to climate.

Africa—Political Division. **Hertslet.**

The Map of Africa by Treaty. Vol. I. Abyssinia to Great Britain (Colonies). Nos. 1 to 102. *With numerous Maps.* Vol. II. Great Britain and France to Zanzibar. Nos. 103 to 208. *With Appendix and Index.* By Sir Edward Hertslet, K.C.B. London: Eyre & Spottiswoode, 1894. Size 10½ × 6½, pp. xliv. and 1100. *Price* 36*s*. 6*d*.

The object of this work is, in the words of the author, "to enable all those who are interested in the development of Africa to examine for themselves the title-deeds by which each foreign power maintains its right to the Possessions which it holds, or to Territory which it occupies, or claims influence over, in that part of the world." It is enough to say that the work is similar to Sir Edward Hertslet's well-known volumes on 'The Map of Europe by Treaty,' that it contains numerous maps showing the boundaries and their changes, and that it is provided with full indexes.

Africa—Pygmy Peoples. **Lenz.**

Ueber die sogenannten Zwergvölker Afrikas. Vortrag, gehalten den 7 März, 1894. Von Oskar Lenz. ('Vorträge des Vereines zur Verbreitung naturwissenschaftlicher Kenntnisse in Wien, XXXIV Jahrgang. Heft 15.') Wien, 1894. Size 7½ × 4½, pp. 38.

A popular paper on the diminutive races of Africa.

Cameroons—Geology. **Knockenhauer.**

M. Forschungs. Deutschen Schutzgebieten **8** (1895): 87–105.

Geologische Untersuchungen im Kamerungebiete. Von Bergassessor B. Knockenhauer. *Diagrams.*

A sketch of the geological structure of the Cameroons district.

Cameroons—Yaúnde. **Zenker.**

M. Forschungs. Deutschen Schutzgebieten **8** (1895): 36–70.

Yaúnde. Von G. Zenker. *Illustrations.*

A full description of the Yaúnde tribe in the interior of the Cameroons, with notes on their habits and customs, social relations, beliefs, etc.

Central Africa. **Vierkandt.**

Die Volksdichte im westlichen Central-Afrika, Habilitationsschrift verfasst von Dr. A. Vierkandt. Leipzig: Duncker & Humblot, 1895. Size 10 × 6½, pp. 110. *Maps. Presented by the Author.*

This will receive special notice.

Central Africa. *Verh. Ges. Erdk. Berlin* **22** (1895): 103–119. **Götzen.**

Herr A. Graf von Götzen, Ueber seine Reise quer durch Central-Afrika. *With Map.*

Central Africa—Victoria Nyanza. **Fischer.**

Petermann's M. **41** (1895): 1–6, 42–46, 66–72.

Am Ostufer des Victoria-Njansa. Aus dem Reisetagebuch. Von Dr. G. A. Fischer. *With Map.*

East Africa. *Oesterreichische Monats. Orient* **21** (1895): 1–4. **Baumann.**

Oesterreichisch-ungarische Interessen in Ostafrika. Von Dr. Oscar Baumann.

East Africa—Zambesi. *Scottish G. Mag.* **11** (1895): 114–130. **Keane.**

An East African Waterway. By Commander Henry J. Keane.

On the navigation of the Zambesi.

Egypt—Agriculture. **Floyer.**

Note sur l'emploi d'une argile comme fertilisant dans la Haute-Égypte. Par E. A. Floyer. Le Caire: Imp. Nationale, 1894. Size 9½ × 6½, pp. 8. *Presented by the Author.*

Egypt—The Nile. *Nature* **51** (1895): 444–448. **Scott-Moncrieff.**

The Nile. A lecture delivered at the Royal Institution, on January 25, by Sir Colin Scott-Moncrieff.

French Sudan. **Monteil.**

De Saint-Louis à Tripoli par le Lac Tchad. Voyage au travers du Soudan et du Sahara accompli pendant les années, 1890–91–92. Par le Lieut. Colonel P.-L. Monteil. Préface de M. le V$^{\text{te}}$ Melchior de Vogüé. Paris: F. Alcan [1894]. Size 13 × 8½, pp. x. and 464. *Portrait, Map, and Illustrations. Presented by the Author.*

This splendid record of Colonel Monteil's great journey will receive a special review.

French West Africa. **Maistre.**

C. Maistre. A travers l'Afrique Centrale, du Congo au Niger, 1892–1893. Préface de M. le Prince d'Arenberg. Paris: Hachette & Co., 1895. Size 11 × 7½, pp. x. and 308. *Maps and Illustrations. Price* 20*s.*

M. Maistre's great journey from the basin of the Congo to that of the Chad has frequently been referred to in these pages. It is only necessary to say that the volume now published does it justice in a well-illustrated form.

French West Africa—Niger. **Péroz.**

Commandant Péroz. Au Niger. Récits de Campagnes, 1891–1892. Paris: Calmann Lévy, 1894. Size 9 × 5½, pp. 426. *Map. Price* 7*s.* 6*d.*

A soldier's account of the French operations on the Upper Niger, containing much information regarding geography and the inhabitants of the country.

German East Africa—Kilimanjaro. **Volkens.**

Verh. Ges. Erdk. Berlin **22** (1895): 152–173.

Herr Prof. Dr. G. Volkens: Exkursionen am Kilima-Ndjaro.

German South-West Africa. *Verh. Ges. Erdk. Berlin* **22** (1895): 174–187. **Uechtritz.**

Herr B. E. von Uechtritz: Reisen in Südwest-Afrika.

An account of journeys in South-West Africa in 1891–93.

Gold Coast Colony. **Bell.**

Outlines of the Geography of the Gold Coast Colony and Protectorate. Compiled for use in the Colonial Schools, by Hesketh Bell. London: Sampson Low & Co., 1894. Size 7½ × 5, pp. iv. and 70. *Maps. Presented by the Publishers.*

This little schoolbook is of value, apart from its educational usefulness, for the description it contains of the commercial products of the Gold Coast.

Madagascar. *B.S. Normande G.* **16** (1894): 242–272, 310–347. **Gravier.**

Les Français à Madagascar. Par M. Gabriel Gravier. *With facsimile Maps.*

Morocco. *Rev. G.* **36** (1895): 171–178. **Milhaud.**

Le Climat du Maghreb el Aksa. Contribution à l'étude de la géographie physique du Maroc. Par Albert Milhaud.

A compilation from the works of various authors, to which reference is made.

North Africa. **Keane.**

Stanford's Compendium of Geography and Travel (New Issue), Africa. Vol. i., North Africa. By A. H. Keane. London: E. Stanford, 1895. Size 8 × 5½, pp. xvi. and 640. *Maps and Illustrations. Price* 15*s. Presented by the Publisher.*

Africa will occupy two volumes of the new issue in place of the one previously devoted to it; and the work is entirely new, a fact that is not prominently indicated by the title. Mr. Keane has given a careful and systematic discussion of northern Africa, including the Atlas region, Tripolitana, the Sahara, the Black Zone or Sudan, Inhabitants and states of the Sudan, Italian North-East Africa, Egypt, and Nubia.

Portuguese East Africa—Beira. *Scottish G. Mag.* 11 (1895): 180–185. **Ross.**

Beira. By A. Carnegie Ross, H.B.M. Consul at Beira.

South Africa. **Leclercq.**

A travers l'Afrique Australe. Par Jules Leclercq. Paris: E. Plon, Nourrit & Co., 1895. Size 7½ × 4½, pp. 312. *Maps and Illustrations. Presented by the Author.*

M. Leclercq describes, in his well-known graphic manner, his impressions of a recent visit to the South African colonies, republics, and protectorates.

NORTH AMERICA.

Canada. **Parkin.**

The Great Dominion. Studies of Canada. By George R. Parkin. London: Macmillan and Co., 1895. Size 8 × 5½, pp. viii. and 252. *Maps. Presented by the Publishers.*

These studies "touch upon the most significant conditions of Canadian life, the most important of the problems which confront Canadians, and those external relations which have the greatest general interest." They were made on the spot during an extended tour in Canada, and verified on a subsequent visit, and they are already favourably known on account of their first publication in the *Times*. The subjects dealt with are the North-West, the Canadian Pacific Railway, Coal, Eastern Canada, British Columbia, Northern Canada, Trade relations and trade-policy, Labour, Education and Political tendencies. An index concludes the work, and there are three maps of the chief railway-systems.

Canada—British Columbia. *Alpine J.* 17 (1895): 289–296. **Green.**

Climbing in the Selkirks and adjacent Rocky Mountains. By Wm. Spotswood Green. *With Two Illustrations.*

Canada—Tides and Currents. **Dawson.**

Report of W. Bell Dawson, C.E. Survey of Tides and Currents in Canadian Waters. [Ottawa, 1894.] Size 10 × 6¾, pp. 14. *Presented.*

Mexico—Yucatan. *Globus* 67 (1895): 197–201. **Sapper.**

Die unabhängigen Indianerstaaten von Yucatan. Von Dr. Karl Sapper. Coban. *With Map.*

North America. **Guest.**

A Round Trip in North America. By Lady Theodora Guest. With Illustrations from the Author's Sketches. London: Edward Stanford, 1895. Size 9 × 6, pp. 270. *Price 10s. 6d. Presented by the Publisher.*

A pleasing record of a pleasant holiday in the United States and Canada, including a tour in California.

Pacific Coast—Mountains. **Kerr and Chapman.**

Table of Elevations within the Pacific Slope. Compiled for the Sierra Club, by Mark B. Kerr and R. H. Chapman. (Publications of the Sierra Club, Number 8.) San Francisco, 1895. Size 10 × 6¾, pp. 32.

The tables give the height in feet, the approximate position and authority of each important summit in California, Nevada, Oregon, Washington, Alaska, British Columbia, and Lower California, the list being alphabetical under each state.

United States. **Roosevelt.**

The Winning of the West. By Theodore Roosevelt. Vol. i. From the Alleghanies to the Mississippi, 1769–1776; vol. ii. Ditto, 1777–1783: vol. iii. The Founding of the Trans-Alleghany Commonwealths, 1784–1790. New York: G. P. Putnam's Sons, 1889–94. Size 9½ × 6¼, pp. (vol. i.) xvi. and 352; (vol. ii.) 428; (vol. iii.) vi. and 340. *Maps.*

The first volume traces the expansion of the colonies from the Alleghanies toward the Mississippi between 1769 and 1776; volume ii. continues the story of this advance by the United States to 1783; and volume iii. treats of the founding of trans-Alleghany commonwealths from 1784 to 1790.

United States—California. **Lawson.**

The Geomorphogeny of the Coast of Northern California. By Andrew C. Lawson. (University of California, Bulletin of the Department of Geology, vol. i. No. 8, pp. 241–272.) Size 10½ × 7½. *Presented by the Author.*

United States—California. *Sierra Club B.* 1 (1895): 168–186. **McClure.**

Explorations among the Cañons north of the Tuolumne River. By N. F. McClure. *With Sketch-Maps.*

United States—Genesee River. **Grabau.**

P. Boston S. Natural History 26 (1894): 359–369.

The Preglacial Channel of the Genesee River. By Amadeus W. Grabau. *With Figures.*

United States—Lake Michigan. **Brower.**

No. 108—Part II. U.S. Hydrographic Office. Sailing Directions for Lake Michigan, Green Bay, and Straits of Mackinac. Washington:

Government Printing Office, 1894. Size 9½ × 6, pp. vi. and 140. *Charts. Presented by the U.S. Hydrographic Office.*

The charts show the prevailing currents of the lakes, and plans of the chief canals and harbours.

United States—Minnesota. **Brower.**

The Mississippi River and its Source. A Narrative and Critical History of the Discovery of the River and its Head-waters, accompanied by the Results of Detailed Hydrographic and Topographic Surveys. By Hon. J. V. Brower. With an Appendix by Alfred J. Hill. Minneapolis, Minn.: Harrison and Smith, 1893. Size 9½ × 6½, pp. xv. and 360. *Portraits, Maps, and Illustrations. Presented by the Author.*

This important work will form the subject of a special review.

United States—New England. **Woodworth.**

P. Boston S. Natural History **26** (1894): 197–220.

Some Typical Eskers of Southern New England. By J. B. Woodworth. *With Figures.*

United States—Pennsylvania. *America J. S.* (3) **49** (1895): 174–185. **Williams.**

Notes on the Southern Ice Limit in Eastern Pennsylvania. By Edward H. Williams. *With Diagram.*

A record of progress in tracing out the boundary of glaciation in North America.

United States—South Carolina. **Whitney.**

John Hopkins University Studies in Historical and Political Science. Thirteenth Series, I.–II. Government of the Colony of South Carolina. By Edson L. Whitney. Baltimore: The Johns Hopkins Press, 1895. Size 9½ × 6, pp. 122.

United States—Wages. **Levasseur.**

Institut de France. Le Salaire aux États-Unis. Par M. E. Levasseur. Lu dans la séance publique annuelle des cinq Académies du 25 Octobre 1894. Paris: Firmin-Didot & Co., 1894. Size 11½ × 9, pp. 20. *Presented by the Author.*

CENTRAL AMERICA AND WEST INDIES.

Amazon Valley Tribes. *J. Anthropological I.* 24 (1895): 236–284. **Markham.**

A List of the Tribes in the Valley of the Amazon, including those on the Banks of the Main Stream and of all its Tributaries. Attempted by Clements R. Markham, C.B., etc. (Second Edition.) *Also a separate copy, presented by the Author.*

This list contains the names, habitats, and concise descriptions of no less than 905 different tribal branches belonging to more than 600 separate tribes, together with a catalogue of 70 authorities, with their dates. It is a revision and extension of an earlier list published by Mr. Markham thirty-one years ago.

American Languages. **Mitre.**

Lenguas Americanas. Estudio bibliográfico-lingüistico de las obras del P. Luis de Valdivia sobre el Araucano y el Allentiak, con un vocabulario razonado del Allentiak. Por Bartolomé Mitre. La Plata, 1894. Size 6½ × 5, pp. 154. *Presented by the Author.*

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Baltic Sea. **Krümmel.**

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7. Salzgehalt (Promille). Entworfen u. gezeichnet von Prof. O. Krümmel. Petermann's 'Geographische Mitteilungen,' Jahrgang 1895. Tafel 5. Justus Perthes, Gotha. *Presented by the Publisher.*

Belgium. **l'Institut Cartographique Militaire.**

Carte des Chemins de Fer, Routes & Voies Navigables de la Belgique, dressée à l'échelle du 1 : 320,000 or 5·1 stat. miles to an inch. Publiée par l'Institut Cartographique Militaire. Bruxelles, 1895. Avec la division du territoire en Arrondissements Administratifs.

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Karte des Deutschen Reiches. Scale 1 : 100,000 or 1·5 stat. mile to an inch. Sheets: 142, Wilhelmshaven; 219, Pyritz; 373, Gubran; 412, Sömmerda; 659, Konstanz. Herausgegeben von der Kartogr. Abtheilung der Kgl. Preuss. Landes-Aufnahme, 1894. *Price* 1·50 *marks each sheet.*

Scandinavia. **Roth.**

Norden af Dr. Magnus Roth. Scale 1 : 1,000,000 or 15·8 stat. miles to an inch. P. A. Norstedt & Söners Förlag. Ny öfversededd upplaga. 1895. 8 sheets.

ASIA.

Central Asia. **Wyld and Bacon.**

Wyld's Military Staff Map of Central Asia and Afghanistan. Scale 1 : 2,000,000 or 31·5 stat. miles to an inch. London: G. W. Bacon & Co. 4 sheets. *Presented by the Publishers.*

Central Asia. **Sven Hedin.**

Topographische Skizze des Kleinen-Kara-Kul und des Bassik-Kul. Aufgenommen und gezeichnet von Dr. Sven Hedin. Juli 1894. Scale 1 : 50,000 or 1·2 inch to a stat. mile. Petermann's 'Geographische Mitteilungen,' Jahrgang 1895. Tafel 6. Gotha: Justus Perthes. *Presented by the Publisher.*

Chitral. **Surveyor-General of India.**

A war-map showing the scene of operations of the Chitral Relief Force. Scale 1 : 1,520,640 or 24 miles to an inch. Taken from the map of Afghanistan, 1889, with corrections to date. Published under the direction of Colonel C. Strahan, R.E., Surveyor-General of India, April, 1895. Calcutta: Thacker, Spink & Co. *Price (uncoloured)* 1 *rupee.*

This map has been produced at the Survey of India Office, Calcutta, to show the scene of the recent operations of the Chitral Relief Force. It is clearly printed, has been corrected to date, and is well suited to the purpose for which it has been published.

Chitral. **Johnston.**

Map to illustrate the Chitral expedition in North-West India. Scale 1 : 3,225,000 or 50·9 stat. miles to an inch. W. & A. K. Johnston, Edinburgh and London. *Price* 6*d*. (*coloured*). *Presented by the Publishers.*

This is one of the numerous maps which have lately been published to illustrate the country traversed by the Chitral Relief Expedition. It also shows the north-west portion of India, and, as all means of communication are laid down, it will be useful for general reference with regard to that part of the Indian Empire.

North-West Frontier of India. **Bartholomew.**

Bartholomew's Special Map of the North-Western Frontier of India. Scale 1 : 3,300,000 or 52 stat. miles to an inch. With inset of Chitral and adjacent country. Scale 1 : 1,400,000 or 22 stat. miles to an inch. J. Bartholomew & Co., Edinburgh, 1895. *Price* 1*s*. *Presented by the Publishers.*

This is a general map of North-West India and the neighbouring States, with an inset on an enlarged scale of Chitral. In the principal map no hill-shading is given, and in the inset the mountains are so faintly indicated that it conveys but a poor idea of the rugged nature of the country.

North-West Frontier of India. **Stanford.**

Stanford's Sketch-Map of the North-West Frontier of India from Peshawar to the Pamirs. Scale 1 : 633,600 or 10 stat. miles to an inch. London: Published by Edward Stanford. *Price* 5*s*.

The hill-shading in this map is very pronounced, and clearly shows the difficulties which the Chitral Relief Expedition has had to overcome. All the latest material has been used by the compiler, and the scale on which it is drawn is sufficiently large for general purposes of reference. Boundaries have been carefully laid down, and all the trigonometrical stations, as well as ascertained heights, are shown.

AFRICA.

Africa—Madagascar. **Service Géographique de l'Armée.**

Carte de l'Afrique. Scale 1 : 2,000,000 or 31·5 stat. miles to an inch. Publié par le Service Géographique de l'Armée, Paris, 1894. Sheets Nos. 47, Antsirana; 52, Antananarivo. *Price* 1 *fr. each.*

German East Africa. **Kiepert.**

Karte von Deutsch-Ostafrika. 29 Blatt und 8–10 Ansatzstücken im Maassstabe von 1 : 300,000 (or 4·8 stat. miles to an inch). Konstruirt und gezeichnet unter Leitung von Dr. Richard Kiepert. Im Auftrage und mit Unterstützung der Kolonial-Abtheilung des Auswärtigen Amts, herausgegeben durch die Verlagshandlung Dietrich Reimer (Hoefer und Vohsen), Berlin. Sheets: B. 4, C. 3, C. 4.

When completed, this map will consist of 29 sheets and 8 or 10 insets, prepared under the direction of Dr. R. Kiepert, at the request and with the assistance of the Colonial Department of the German Foreign Office. The three sheets issued are—Sheet B. 4, which embraces the country around Lake Eyassi; Sheet C. 4, showing the country south of Lake Eyassi; and Sheet C. 3, which contains the country in the neighbourhood of Tabora. In their construction, all the latest material has been used, and the routes of all well-known travellers have been laid down. The manner in which these sheets have been produced leaves nothing to be desired.

West Africa. **Stanford.**

Stanford's Map of the British Possessions in West Africa, 1895. Scale 1 : 5,900,000 or 93·1 stat. miles to an inch. London: E. Stanford, 1895. *Price* 3*s*.

GENERAL.

The World. **The "Times."**

The Times Atlas. Complete in fifteen weekly parts. Published at the *Times* Office, London. Parts 1 to 5. *Price* 1*s*. each part. *Presented by the Publishers.*

This atlas is a new and revised edition of the "Universal Atlas," which latter is an English edition of Andree's well-known Handatlas. It is to be completed in fifteen weekly parts, containing 173 maps, and an index. The maps, in the parts already issued, are produced in a very clear style, and have been carefully revised. When completed it will be an exceedingly useful atlas for general reference, and probably the cheapest of its class that has ever been published in this country.

CHARTS.

Admiralty Charts. **Hydrographic Department, Admiralty.**

Charts and Plans published by the Hydrographic Department, Admiralty, January and February, 1895. *Presented by the Hydrographic Department, Admiralty.*

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N.B.—It would greatly add to the value of the collection of Photographs which has been established in the Map Room, if all the Fellows of the Society who have taken photographs during their travels, would forward copies of them to the Map Curator, by whom they will be acknowledged. Should the donor have purchased the photographs, it will be useful for reference if the name of the photographer and his address are given.

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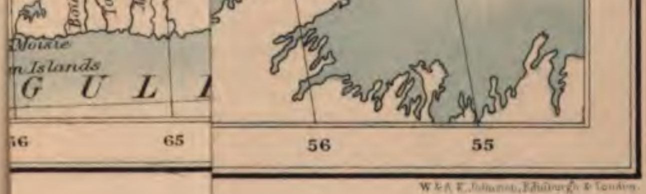

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